Stress Coping Across the Lifespan:
Investigating Mechanisms of Resilience and the Impact of Skills-based Interventions on Well-being

by

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Dedication

This dissertation is dedicated to everyone who has gone through something and come back stronger. Whether you bounced right back or it took years of hard work, your resilience is my inspiration.

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Abstract

Stress exposure has been consistently linked with negative mental health outcomes. While the vast majority of people experience stress, resilience is possible. This dissertation examined factors associated with resilience across the lifespan and investigated whether interventions may promote resilience factors and improve well-being among individuals exposed to stress.

This dissertation consists of three studies. The first study examined whether greater mastery and social support influenced the relationship between exposure to negative life events and symptoms of anxiety and depression. Further, this study assessed the differential impact of adolescent subjective stress ratings, consensus stress ratings developed based on context, and stress sensitivity (e.g. the discrepancy between subjective and consensus ratings) on internalizing symptoms. We found that greater social support was associated with reduced depression and greater mastery was associated with reduced anxiety and depression. Gender moderated the associations in that greater social support was associated with reduced subjective stress and consensus stress for males but with greater subjective stress and stress sensitivity for females. Finally, we found that greater subjective and consensus stress ratings and greater stress sensitivity were related to greater symptoms of anxiety and depression. These findings suggest that social support, mastery, and stress sensitivity have important implications for the likelihood of resilience in the context of greater stress exposure.

The second study investigated the effectiveness of the Kids' Empowerment Program (KEP), a novel skills-based group intervention, at influencing prosocial behaviors, emotion regulation skills, parent-child relationship quality, and well-being in school-aged children. Participating in KEP was associated with reductions in child reported anxiety and parent reported depression, increased feelings of parent-child closeness, and increased use of adaptive emotion regulation skills. Stress exposure did not moderate the association between participating in the intervention and changes in resilience factors. These results support KEP as an effective intervention program that improves both mental and social well-being and increases children's repertoire of emotion regulation skills needed to effectively cope with environmental stressors.

The third study investigated the effectiveness of Mood Lifters™, a novel skills-based group program for adults, on influencing coping skills and social support. Participating in the Mood Lifters™ intervention was associated with greater use of support seeking and approach coping. Increases in approach coping and support seeking and decreases in disengagement coping were associated with reductions in anxiety and perceived stress. Although tests of mediation were not significant, these findings suggest that changes in the use of coping behaviors may contribute to reductions in perceived stress and symptoms of anxiety as a result of participating in Mood Lifters™. Finally, stress exposure moderated the impact of the intervention on changes in coping skills and outcomes. For individuals reporting greater childhood trauma, increased avoidance and approach coping was related to reduced anxiety. These results support Mood Lifters™ as an effective intervention program that promotes the development of adaptive coping skills based on one's circumstances.

The results of this dissertation suggest that social support, coping skills, and mastery are associated with resilience across the lifespan. Further, novel skills-based interventions may

improve coping skills and the use of and perception of social support, bolstering the likelihood of resilience among individuals exposed to stress. While the experience of significant stress is common, this dissertation suggest that the way individuals perceive and respond to stressors has important implications for their likelihood of resilience.

Chapter 1 Overview

Stress and Health

Stress exposure increases risk for negative mental (Staufenbiel, Penninx, Spijker, Elzinga, & van Rossum, 2013) and physical health outcomes (Shields & Slavich, 2017) and reduced longevity (Epel & Lithgow, 2014). For example, the experience of daily hassles, job strain, negative and traumatic life events, and prejudice have been associated with negative health conditions including depression (Asselmann, Wittchen, Lieb, & Beesdo-Baum, 2017; Kraaij, Arensman, & Spinhoven, 2002; Tennant, 2002), anxiety (Spinhoven et al., 2010), cardiovascular disease (Cho, 2013), immune dysregulation (Fagundes, Glaser, & Kiecolt-Glaser, 2013), and obesity (Brunner, Chandola, & Marmot, 2007; Lucassen & Cizza, 2012; McLaren, 2007). The significant negative impact of stress on health suggests a need for more research investigating factors and interventions that may foster resilience in the face of stress exposure.

Exposure to severe and chronic stressors have been shown to influence the body's ability to respond to stressors. Physiological stress processing is regulated by the Hypothalamus-Pituitary-Adrenal Axis (HPA Axis), a system responsible for maintaining biological homeostasis through the release of stress hormones such as cortisol (Hellhammer, Wüst, & Kudielka, 2009). When the HPA axis is activated in response to a stressor, the body mobilizes energy resources to prepare the body for fight or flight and suppresses non-essential functions to conserve energy (Handa & Weiser, 2014), which impact growth, immunity, digestion, and reproduction (Kamin & Kertes, 2017). Chronic suppression of these systems may provide one mechanism by which stress exposure leads to poor health outcomes. For example, dysregulation of the HPA axis has

been linked to health conditions such as obesity (Bose, Oliván, & Laferrère, 2009) (Bose, Oliván, & Laferrère, 2009), depression (Lopez-Duran, Kovacs, & George, 2009; Staufenbiel et al., 2013), PTSD (Yehuda, Halligan, & Grossman, 2001; Yehuda & Seckl, 2011), and poor sleep quality (Vgontzas et al., 2001; Yap, Rice-Lacy, Bei, & Wiley, 2018).

However, significant individual differences in HPA stress reactivity exist. Subjective stress ratings do not always correlate with HPA axis responses to stress (Hjortskov, Garde, Ørbæk, & Hansen, 2004). Instead of activating to all sources of stress, the HPA axis appears to reliably respond to stressors that involve novelty, socially evaluative-threat and are viewed as uncontrollable (Dickerson & Kemeny, 2004). Experimental manipulations of novelty, control, and coping have been shown to impact HPA axis reactivity, in that reduced novelty and improved control and coping capacity resulted in a reduction of HPA reactivity to stressors (Abelson, Khan, Liberzon, Erickson, & Young, 2008; Abelson, Khan, Young, & Liberzon, 2010). Additionally, the availability of resources such as coping skills and social support appear to moderate HPA axis activation (Abelson et al., 2014; DeVries, Glasper, & Detillion, 2003; Hostinar & Gunnar, 2013; Mayer et al., 2017).

The social self-preservation theory holds that individuals monitor the environment for threat to their self-esteem and social status and upon identifying these threats, mount psychological, physiological (e.g. HPA axis), and behavioral responses to manage the threat (Dickerson & Kemeny, 2004). Social status is often based on people's impression of their position in society, their self-esteem, and the acceptance or rejection they feel from the outside world. Therefore, individuals who are confident in their social status, such as those that have strong social support networks, may be more resilient to stress (Leary & Baumeister, 2000). In addition, a sense of mastery, control, or the ability to effectively cope with the stressor may

reduce the perceived intensity of the threat, and therefore overall stress reactivity. Taken together, the detrimental effects of stress, via the chronic activation of the HPA axis system, may be mitigated by the presence of several protective factors, such as mastery and social support, which may be malleable through psychosocial interventions.

Defining and Measuring Stress

Lazarus and Folkman (1984) define stress as an interaction between an individual and their environment in which the individual perceives that the environmental demands outweigh their capacity to meet those demands. Stressful life events thus may refer to experiences such as trauma, negative life events, and daily hassles that overwhelm one's coping capacity. Daily hassles refer to small frustrations and irritants that occur as the result of one's interaction with their environment (Kanner, Coyne, Schaefer, & Lazarus, 1981). Assessing daily hassles has become important in resilience research due to the greater frequency of these events compared to major negative life events and the ability to distinguish between the frequency of hassles and the perceived intensity of each hassle (Jeong, Aldwin, Igarashi, & Spiro, 2016; Schönfeld, Brailovskaia, Bieda, Zhang, & Margraf, 2016). The impact of negative life experiences on health appears to depend on a number of factors such as timing (Roberts & Lopez-Duran, 2019), frequency (Hammen, Kim, Eberhart, & Brennan, 2009), and actual or perceived severity of stressful events (Bale, 2006; Williamson et al., 2003). Stressors may be acute, such as a traumatic or uncontrollable negative life events, or it may be chronic, that is experiencing repeated acute stressors or prolonged exposure to stressors (Hammen et al., 2009). Further, individuals with fewer external (e.g. social support) and internal (e.g. coping skills, mastery) resources may have a reduced capacity to cope with negative life events. Thus, the context

surrounding life events matters and contributes to the individual's subjective experience of stress.

The likelihood of stress exposure varies based on social factors. The nature of certain careers, including health care workers, fire-fighters, police officers and EMT's, may increase the likelihood of experiencing traumatic events and workplace stress (D. Edwards, Burnard, Coyle, Fothergill, & Hannigan, 2000; Itzhaki et al., 2018; Lee, Lee, Kim, Jeon, & Sim, 2019; T. D. Smith, Hughes, DeJoy, & Dyal, 2018) . Additionally, individuals belonging to racial and ethnic minority groups and those within the LGBTQ community may be more likely to experience prejudice which has been shown to negatively affect mental health (Balsam, Molina, Beadnell, Simoni, & Walters, 2011; Frost, Lehavot, & Meyer, 2015; Meyer, 2003, 2015; Payne & Smith, 2013; Wei et al., 2010). Economic factors may also influence stress exposure. Lower socioeconomic status (SES) individuals may experience more daily hassles and therefore more stress overall (Grzywacz, Almeida, Neupert, & Ettner, 2004; Myers, 2009). In fact, SES has frequently been used as a marker of adversity given the strong associations between SES, availability of resources, and the experience of adversity (Baum, Garofalo, & Yali, 1999; Vliegenthart et al., 2016). Finally, gender may moderate the influence of stressors on health. Men perceive intellectual and performance failures as more stressful (Stroud, Salovey, & Epel, 2002). In contrast, women perceive social rejection as more threatening and tend to respond to stress with a 'tend and befriend' response that includes nurturing and creating social networks (Stroud et al., 2002; C. J. Taylor, 2014; S. E. Taylor et al., 2000). Therefore, interpersonal difficulties may be perceived as more stressful for women, while academic and work difficulties may be particular important for men. Taken together, this research suggest that social and

economic factors may contribute to individual differences in the experience and perception of stress.

Developmental Issues in Stress Research

The impact of stress on health appears to vary as a function of the developmental timing of stress exposure. Exposure to stress during developmentally sensitive periods, such as early childhood, appear to have a strong impact on health outcomes (Carr, Martins, Stingel, Lemgruber, & Juruena, 2013). In fact, adverse experiences in childhood account for 44% of childhood onset mental health conditions and 20% of adult onset mental health disorders (Kessler et al., 2010). Exposure to adversity during sensitive periods appears to impact the development of biological stress processing systems (Roberts & Lopez-Duran, 2019), increasing risk for negative outcomes. The stress sensitization hypothesis suggests that individuals who experience early life stress may be more likely to demonstrate negative outcomes in the face of recent negative life events (Harkness, Bruce, & Lumley, 2006). That is, individual who experience adversity in childhood are more likely to develop negative health conditions at lower rates of recent life adversity.

Development also impacts type of stress individuals are likely to experience. Preschool aged children are most likely to experience events such as the birth of a sibling, the death of a non-parent relative, moving to a new school. and physical health problems (Furniss, Beyer, & Müller, 2009; Muldoon, 2003). The experience of negative life events among young children is common, with one study showing that 80% of children about to enter preschool reported at least one negative life event and the majority reported at least 2 events (Furniss et al., 2009). This may be particularly important for health as preschool aged children have a limited ability to perceive whether events are controllable or uncontrollable (Altshuler & Ruble, 1989) and cope with

stressful experiences (Clarke, 2006). In fact, many experiences in childhood may be viewed by the child as outside their control since parents and other adults generally make major life decisions for them (Muldoon, 2003). The increased likelihood of young children to experience events perceived as uncontrollable suggests a need to bolster children's ability to cope with stressful events and reduce the risk for negative outcomes.

As children develop, they become more aware of the potential for harm or danger in particular events, thus changing the subjective stress conferred by these events (Dong, Yang, & Ollendick, 1994; Field & Lawson, 2003). Developmental changes in perception and cognitive abilities actually results in children labeling life events as less stressful over time (Yamamoto & Byrnes, 1987; Yamamoto & Davis, 1982). Further, fears during this stage of childhood are influenced by direct conditioning, modelling, and instruction or information from trusted others (Muris & Field, 2010; Ollendick & King, 1991). Therefore, a child's family and social support systems may impact their perceptions of stress and ability to cope.

The onset of puberty and the transition to adolescence represents another sensitive period in development. The adolescent transition is associated with maturation of stress processing systems, including improvement of neural negative feedback systems regulating the HPA axis (Roberts & Lopez-Duran, 2019). Exposure to stressors during this period may have deleterious effects on the development of metabolic, hormonal, neural, and immune systems due to the negative effects of prolonged cortisol exposure (Handa & Weiser, 2014; McEwen & Seeman, 1999). This overproduction of cortisol as a result of chronic stress may damage key brain structures, such as the hippocampus, imperative for HPA axis regulation (McEwen & Seeman, 1999; Myers-Schulz & Koenigs, 2012). This damage may also lead to a dysregulation in HPA axis feedback mechanisms, resulting in glucocorticoid overproduction that can contribute

directly to many of the adverse behavioral and physiological outcomes associated with chronic stress (Lupien, McEwen, Gunnar, & Heim, 2009; McEwen & Seeman, 1999).

The adolescent transition is characterized by significant increases in stress exposure overall (Collins & Steinberg, 2007). Teenagers are more likely to report greater social and family difficulties and academic concerns (Huan, Yeo, Ang, & Chong, 2006; Torbjørn Torsheim & Wold, 2003). The fear of peer evaluation also increases significantly during the adolescent transition (Somerville, 2013), suggesting that greater exposure to interpersonal difficulties may be perceived by adolescents as particularly stressful. Gender differences may also impact exposure to stressors in adolescence. Adolescent girls were shown to experience more social, family, peer, and intimacy stressors and report greater perceived stress than boys (Li, DiGiuseppe, & Froh, 2006; Wagner & Compas, 1990). This differential exposure to challenging and stressful events accounted for the greater rates of depression among adolescent girls (Petersen, Sarigiani, & Kennedy, 1991). The developmental increase in stress exposure combined with the normative maturational and hormonal changes of adolescence may partially explain increases in symptoms of internalizing psychopathology during the adolescent transition (Roberts & Lopez-Duran, 2019). Adolescents who demonstrate more effective stress coping behaviors may be less likely to experience negative health outcomes (Khan, Hamdan, Ahmad, Mustaffa, & Mahalle, 2016), highlighting the need for a better understanding of factors associated with resilience during this developmental stage.

After adolescence, individuals enter the developmental stage of 'emerging adulthood." Generally encapsulating the period from 18 to 24 years old, this stage involves developing skills for maintaining self-sufficiency, independence, and fostering intimate relationships (Meadows, Brown, & Elder, 2006). Many young adults in this stage may also be enrolled in college or

advanced education and therefore face greater stressors related to academics, finances, and social groups (Dusselier, Dunn, Wang, Shelley, & Whalen, 2005). Finally, middle age and late adulthood comes with its own set of difficulties. Individuals in this developmental stage report more chronic psychosocial stressors, including bereavement and caregiving for loved ones (Ong, Bergeman, Bisconti, & Wallace, 2006). In conclusion, development may influence both the life events experienced along as well as the perceived stress conferred by these events and the subsequent impact on health. Researchers investigating stress exposure must consider developmental processes in order to accurately assess how stressful life events influence risk for negative health outcomes.

Resilience

Although the vast majority of people experience at least one traumatic event in their lives, two thirds of adults exhibit no functional or psychological impairment after stress exposure (Bonanno et al., 2011). These examples of resilience suggest that effective coping with adversity is possible if not the norm. Resilience has been defined as the ability to succeed, resist, cope with, or 'bounce back' from adversity (Chmitorz et al., 2018; Kalisch et al., 2017; Kalisch, Müller, & Tüscher, 2015). Resilience in this context reflects the extent to which an individual's coping mechanisms buffer against the negative effects of stress (Gaffey, Bergeman, Clark, & Wirth, 2016). The conceptualization of resilience has significantly changed in recent years from a trait-oriented approach to a process or outcome-oriented approach (Chmitorz et al., 2018). In the original trait-oriented approach, resilience was viewed as a personality trait that allowed individuals to better adapt to the demands of their environment (Hu, Zhang, & Wang, 2015; Ong et al., 2006). However, there is limited evidence supporting resilience as a personality trait. Instead, it appears that personality traits represent one of many resilience factors promoting

reduced negative outcomes in the face of adversity (Bonanno & Diminich, 2013; Kalisch et al., 2017; Luthar, Cicchetti, & Becker, 2000).

The current conceptualization views resilience as an outcome when exposed to adversity and suggests that resilience is influenced by multiple factors that can be both internal and external (Bonanno & Diminich, 2013; Bonanno, Romero, & Klein, 2015; Kalisch et al., 2017, 2015). This definition of resilience is especially important for intervention research because it suggests that factors associated with resilience are modifiable and teachable (Chmitorz et al., 2018). Resilience factors are defined as resources that modify individual responses to stress and adversity, reducing the likelihood of negative outcomes (Fletcher & Sarkar, 2013; Rutter, 1985). Some resilience literature refers to these resources as protective factors because they 'protect' the individual from the negative effects of stress (Hamby, Grych, & Banyard, 2018). Examining the internal and external resources utilized by individuals who show reduced perceived stress, anxiety, and depression when exposed to high levels of negative life events may help identify resilience factors. Although a multitude of factors have been associated with resilience in the face of greater stress exposure (Southwick & Charney, 2012), this dissertation focuses on three factors: social support, coping skills, and mastery.

Social Support. Social support refers to the different types of assistance or help that individuals receive from other people (Southwick et al., 2016). While social support can come in many forms, the research identifies two main categories of social support: instrumental support and emotional support (Semmer et al., 2008). Instrumental support refers to information or tangible acts offered by others. Supportive actions such as assisting with finances or helping with transportation would be considered instrumental support. In contrast, emotional support consists of behaviors by others that bolster one's self-worth or make them feel loved (Semmer et al.,

2008). Examples of emotional support include providing positive feedback or encouragement and empathetic listening.

While social support appears to be important for health across the lifespan, the relationship between social support needs and health varies developmentally. Children demonstrate a preference for same sex friends as young as 33 months of age (Jacklin & Maccoby, 1978) and this preference has been observed in both 6 (Feiring & Lewis, 1987) and 9-year-old children (Mullins, 1991). During middle childhood, children's social networks become more elaborate and significantly more important (Masten & Coatsworth, 1998). Boys and girls at this age tend to use social support differently. Boys tend to have larger support networks, a greater balance of male and female friends (Feiring & Lewis, 1991), and tend to self-disclose about difficult situations only to share information and seek distraction, rather than to seek support (Belle, Burr, & Cooney, 1987). On the other hand, girls demonstrate a greater preference for female friends over time (Feiring & Lewis, 1991), spend more time with peers, and confide in their social support network in order to gain support and help with their problems (Belle et al., 1987). Finally, a positive relationship with a supportive adult appears to be particular important in this developmental stage. A stable relationship with an adult has been associated with better social adjustment in school aged children (Jenkins & Smith, 1990; Wagner, Cohen, & Brook, 1996). Children appear to feel more empowered to engage with negative life events when they have a confident bond with a supportive adult. Including both peer support and adult support in resilience studies may most accurately reflect the child's overall social resources.

Social support becomes more important across the adolescent transition and measures of perceived social support appear to be most strongly associated with well-being (Chu, Saucier, & Hafner, 2010). Well-adjusted adolescents were found to have more positive relationships with

their parents, peers, and teachers compared to adolescents with greater depressive symptoms (Bean, Pingel, Hallqvist, Berg, & Hammarström, 2019; Branje, Hale, Frijns, & Meeus, 2010; Kennedy, Bybee, Sullivan, & Greeson, 2010; Rueger, Malecki, Pyun, Aycock, & Coyle, 2016). The protective nature of social relationships in adolescence may be especially important for individuals experiencing higher levels of stress, such as those experiencing socioeconomic disadvantage (Wight, Botticello, & Aneshensel, 2006). The experience of social support fosters a sense of belonging which has been shown to increase academic engagement and performance (Malecki & Demaray, 2006). Peer support in adolescence has important implications for adolescent identity formation (Meeus & Dekovic, 1995). While many studies suggest that peer support is beneficial during this developmental stage, other studies have found an association between strong peer support and higher levels of problem behaviors and distress (Kerr, Preuss, & King, 2006). For instance, adolescents who associated with deviant or suicidal peers may be more likely to engage in antisocial activities such as substance use or delinquency (Dishion & Owen, 2002) and experience suicidal ideation themselves (Prinstein, Boergers, & Spirito, 2001; Prinstein, Boergers, Spirito, Little, & Grapentine, 2000). The complicated nature of peer social support suggests that additional sources of support may better support adolescent well-being. Teenagers spend a large portion of time at school, thus the experience of school connectedness and success may be particularly important for adolescent health. In fact, teacher and school personnel support were found to be more important than other sources of support (Chu et al., 2010) and adolescents who perceived that their teachers were fair and cared about them were less likely to engage in negative health behaviors such as substance use, suicidal ideation or attempt, and sexual intercourse (McNeely & Falci, 2004). Further, familial support has consistently been associated with well-being among stress-exposed, depressed, and suicidal adolescents (Kerr et

al., 2006; Prinstein et al., 2001). Therefore, family and school personnel may provide significant sources of social support in addition to peer relationships.

Social support may be particularly important for quality of life and well-being for older adults (Mick et al., 2018). Among older adults, higher levels of emotional support are associated with reduced risk of mortality (S. G. Smith, Jackson, Kobayashi, & Steptoe, 2018) improved cognition (Seeman, Lusignolo, Albert, & Berkman, 2001), improved emotional well-being (Bisconti, Bergeman, & Boker, 2006), and better quality of life even in the contact of chronic pain (Jakobsson & Hallberg, 2002). In contrast, loneliness and social isolation are strongly linked with lower social resources and poorer psychological health (Hawkley & Cacioppo, 2010). Thriving older adults appear to optimize their ability to received instrumental and emotional support in order to anticipate and manage daily challenges and chronic stressors (Gaffey et al., 2016; Ong et al., 2006). A study of the impact of social support on psychiatric health after experiencing a major life event (i.e. bereavement, marital separation, poverty), found that high pre-stress exposure social support increased the likelihood of resilience by 40-60% compared to individuals reporting low pre-stress exposure social support (Netuveli, Wiggins, Montgomery, Hildon, & Blane, 2008). Finally, the availability of social support has been shown to influence HPA axis functioning (Cacioppo & Hawkley, 2003; DeVries et al., 2003; Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002), providing a mechanism by which social support may influence well-being in older adults.

Compared to younger populations, older adults are more likely to have smaller social support systems, preferring familiar social partners (Fredrickson & Carstensen, 1990) and maintaining smaller yet closer social ties (Shaw, Krause, Liang, & Bennett, 2007). Social support is often utilized to manage the unique stress associated with aging, including how to cope with

loss and physical and cognitive declines (Bonanno, Wortman, & Nesse, 2004; Ong et al., 2006). Studies of gender differences in social support have found that older men report lower social resources. Older men report smaller social networks and less social contact, lower emotional support, and greater reliance on their partner (Antonucci & Akiyama, 1987; Caetano, Silva, & Vettore, 2013). In conclusion, social support has important implication for health across the lifespan, although the type and manner in which an individual engages with their social support systems differs based on age and gender.

Coping skills. Research suggests that coping skills may represent another resilience factor influencing the impact of stress on health. Coping skills refer to cognitive and behavioral efforts people use to tolerate, escape, or minimize the effects of stress (Lazarus & Folkman, 1984). Coping skills can be considered adaptive or maladaptive (Lazarus & Folkman, 1984). Adaptive coping skills refer to coping with the stressful situations by identifying the situation, actively seeking support, reflecting on possible solutions, and taking action to solve the problem. In contrast, maladaptive coping skills involve withdrawing from the stressful situation and avoiding seeking solutions (Lazarus & Folkman, 1984; Mahmoud, Staten, Hall, & Lennie, 2012). The use of adaptive coping skills is more likely to result in a resolution to the stressful situation and less likely to lead to negative health outcomes (Mahmoud et al., 2012). The influence of adaptive and maladaptive coping skills has been assessed in numerous studies. Adolescents and young adults may be more likely to use maladaptive coping skills, such as escape and avoidance, compared to other age groups (Blanchard-Fields, Sulsky, & Robinson-Whelen, 1991; Irion & Blanchard-Fields, 1987).

The effectiveness of coping skills may depend on the context and stressor (Lazarus & Folkman), suggesting a need to investigate the effectiveness of different coping strategies across

situations. For instance, a number of studies differentiate between problem-focused coping and emotion-focused coping (Compas, Orosan, & Grant, 1993). Problem focused coping refers to attempts to act on a stressor whereas emotion-focused coping entails attempts to manage one's emotions associated with a stressor. In college students, emotion-focused and avoidant coping strategies such as self-blame, denial, and giving-up were associated with negative mental and physical health outcomes (Beasley, Thompson, & Davidson, 2003; Mahmoud et al., 2012). In contrast, behaviors associated with emotion-focused coping, such as positive reappraisal and seeking social support, were seen as adaptive in another study (Mahmoud et al., 2012). Therefore, rather than being universally adaptive or maladaptive, the efficacy of coping skills may vary depending on the context and the nature and intensity of the stressor (Lazarus & Folkman, 1984). For instance, individuals may rely on emotion-coping strategies when feeling overwhelmed and when the stressor is perceived as outside the individual's control. When stressors are within one's control, however, the use of problem-focused coping skills is recommended (Steinhardt & Dolbier, 2008). A study by Steinhardt & Dolbier (2008). used the BRIEF COPE, and instrument that assess the use of 14 different coping strategies, to assess the use of coping strategies by college students. A factor analysis identified 4 categories of coping skills 1) support coping (emotional support, instrumental support, and venting, 2) avoidant coping (denial, behavioral disengagement, and self-blame), 3) problem-solving coping (active, planning, and acceptance) and 4) hopeful coping (positive reframing, religion, substance abuse) (Steinhardt & Dolbier, 2008). Using a factor analysis to group coping skills together for the population of interest allows for the consideration of context and development and therefore provides a better assessment of the unique influence of different types of coping skills on health.

Mastery. One way to increase an individual's feelings of coping self-efficacy is through fostering feelings of mastery. Mastery refers to the extent to which an individual views their situation as being within their control (Pearlin & Schooler, 1978). Individuals with greater mastery feel empowered to influence their environment and secure their desired outcomes (Park et al., 2018; Pudrovska, Schieman, Pearlin, & Nguyen, 2005). The belief that one has control over their experiences is associated with improved health, faster recovery from illness, greater longevity, and fewer and less severe symptoms (Infurna, Gerstorf, & Zarit, 2011). Mastery has been shown to protect against the effects of adversity such as economic hardship (Caputo, 2003). Individuals may gain mastery through practicing their skills and successfully managing a stressor (Southwick & Charney, 2012). Gaining mastery, and therefore confidence in one's ability to deal with stress, allows for a shift in which perceived threats become perceived challenges and increases problem-oriented coping, motivation, and perseverance. Coping with a stressor in this way buffers against the risk for stress-related disorders (Southwick & Charney, 2012).

Feelings of mastery are associated with better problem solving abilities, improved academic achievement and peer relations, and fewer symptoms of depression (Assari & Caldwell, 2017; Parto & Besharat, 2011; Ross & Broh, 2000). Greater mastery was shown to weaken the association between greater financial strain and feelings of distress and anger (Koltai, Bierman, & Schieman, 2018). Feelings of mastery may foster a greater sense of control over one's situation and an ability to cope with their circumstances. A study of phobic patients assessed HPA axis reactivity to a feared stimuli in two experimental conditions: when the patients themselves were responsible for the pace of the exposure treatment and when phobic patients did not have control over the exposures (Mayer et al., 2017). Individuals who reported greater perceived control over the exposure sessions demonstrated lower cortisol stress reactivity

(Mayer et al., 2017). Another study found that among financially disadvantaged women who reported experiencing a high number of acute and chronic stressors, perceived control was associated with reduced symptoms of depression (Grote, Bledsoe, Larkin, Lemay, & Brown, 2007). Therefore, mastery may foster a sense of control and protect against the negative effects of stress exposure on mental health.

Stress Sensitivity. When exposed to the same stressor, individuals vary in the intensity of their biological and affective responses to the stressor (Bale, 2006; Skoluda et al., 2015; Spear, 2009; Turner et al., 2020). Variability in stress sensitivity can be conceptualized as an outcome of stress exposure that is influenced by a variety of resilience factors. For example, imagine an individual lost their job, a significant stressor since it impacts their ability to afford basic necessities such as food and housing. While most individuals will experience distress related to this event, the degree and duration of distress may vary based on the individual's response to the loss. An individual who fixates on their sadness and anger at their company for firing them (emotion focused coping) may withdraw from others (disengagement), use substances to ameliorate their mood, and avoid looking for and applying to new jobs (avoidance). This person may experience a great deal of distress (i.e. high stress sensitivity) that lasts for a longer period of time since their situation remains the same. However, another individual who lost their job may call a friend or family member to process their feelings of sadness and anger (emotional support) or ask that friend or family member if they could borrow some money for food and rent while they find a new job (instrumental support). They may also focus on the positives of this loss (i.e. positive reframing: "I was really stressed at that job and this gives me the opportunity to finds something that makes me happier"), and start updating their resume, reaching out to connections to the field, and applying for jobs (problem-focused

coping). An individual who feels confident in their abilities (mastery), may apply to more jobs and exude confidence in the interviews, increasing their likelihood of securing a new job. Individuals who cope with this loss in these ways may be less likely to experience the same intensity or duration of negative affect (i.e. low stress sensitivity), decreasing the impact of this negative life event on their overall mental wellbeing. Further, stress sensitivity also plays an important role in the physiological effects of stress exposure since trait-level reactivity can influence exposure to stress hormones (B. E. Evans et al., 2013; Johnson, Perry, Hostinar, & Gunnar, 2019; Skoluda et al., 2015; Turner et al., 2020) as well as the intensity of affective responses (Bale, 2006; Wichers et al., 2009) that can contribute to better or worse mental health outcomes.

Studies of stress sensitivity often use controlled laboratory paradigms. For example, using a controlled stressor such as a mild electric shock, a public speech task, or a thermal pain task allow investigators to measure variability in physiological and affective responses to the same task (Dickerson & Kemeny, 2004). Given that the participants are exposed to the same stressor and thus the intensity of the stressor is controlled, the variability in responses can be interpreted as an index of stress sensitivity (Kudielka & Wüst, 2010). Measuring stress sensitivity to past events is significantly more difficult due to the complexity in controlling for the intensity of the stressors. Often investigators measure *stress perception* by asking individuals how they respond to recent events. For example, the popular Perceived Stress Scale (Hewitt, Flett, & Mosher, 1992; Taylor, 2015) asks questions such as "in the last month, how often have you been upset because of something that happened unexpectedly". The assumption is that high scores in response to such questions reflect greater stress sensitivity. The problem is that perceived stress scales do not account for variability in stress exposure in terms of frequency or

the contextual nature of stressful events. So an individual may respond to the question with "Very Often" because the individual was in fact exposed to several major stressors during the previous month. In this case, the individual response may be appropriate and not reflective of increased stress sensitivity.

A more conceptually accurate method to measure stress sensitivity to past events is to use contextual stress interviews (Williamson et al., 2003). Contextual stress interviews allow researchers to gather the context surrounding negative life events, allowing for an examination of stress sensitivity by comparing an individual's perception of stress against the expected response of the average person exposed to the same event. For example The Stressful Life Events Schedule for Children and Adolescents (SLESCA; Williamson et al., 2003) identifies negative life events experienced in the past year and the adolescent's subjective rating of stress conferred by each event. Through a semi-structured interview, researchers gather information about the context surrounding each life event and assign a consensus measure of stress severity using a standardized set of ratings. These consensus ratings allow researchers to compare the adolescent's own subjective report of stress against what is expected of the average teenager given a similar experience. By examining the discrepancy between individuals' subjective responses and the consensus ratings based on context, researchers can more effectively measure stress sensitivity and investigate how variations in stress sensitivity influence the link between stress exposure and mental health outcomes.

In conclusion, social support, coping skills, and feelings of mastery have been supported as factors associated with resilience across the life span. These factors may contribute to stress sensitivity by providing internal and external resources individuals can utilize to cope with stressors, impacting the level of distress experienced and risk for negative mental health

outcomes. Therefore, interventions that target these skills may increase the likelihood of resilience among stress-exposed individuals.

Intervention

The reviewed research on resilience factors suggests that preventative interventions that successfully increase perceived social support and improve stress coping skills and feelings of mastery may reduce the impact of subsequent stress exposure on health. Preventative interventions refer to treatments that aim to prevent the onset of health problems, rather than addressing the problems after the onset of clinically significant symptomatology. Three major categories of preventative interventions have been identified: indicated prevention, selected prevention, and universal prevention (O'Connell, Boat, & Warner, 2009). Indicated prevention programs target individuals who are already displaying symptoms of an illness, including patients demonstrating prodromal or subclinical symptomatology. Selected prevention refers to interventions disseminated among individuals at risk for a specific disorder who are not currently exhibiting symptoms, such as individuals at genetic risk and those that have exposed to chronic or traumatic life events. Finally, universal interventions are programs offered to all individuals regardless of risk status, life experiences, or symptomatology (O'Connell, Boat, & Warner, 2009). While not an exhaustive review, this section highlights indicated, selected, and preventative interventions and the impact of these interventions on improving social support, coping skills, mastery and internalizing psychopathology across the life span.

Individual psychotherapy provides one avenue for improving stress coping and reducing the impact of stress on health. A number of evidence based treatments have been shown to effectively reduce symptoms of anxiety, depression, and perceived stress, including cognitive-behavioral therapy, (CBT; Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012), Interpersonal

Therapy (IPT; de Mello, de Jesus Mari, Bacaltchuk, Verdeli, & Neugebauer, 2005) (IPT; de Mello, de Jesus Mari, Bacaltchuk, Verdeli, & Neugebauer, 2005), and Dialectical Behavioral Therapy (DBT; Panos, Jackson, Hasan, & Panos, 2014). However, access to individual psychotherapy is limited by geographic region, long waiting lists, and financial or insurance resources (Stein, Celedonia, Kogan, Swartz, & Frank, 2013). Group interventions may increase access to care because one clinician or administrator can treat multiple patients simultaneously. Interventions disseminated in group settings may also foster feelings of social connectedness, further promoting resilience. Since this dissertation seeks to understand ways to promote resilience with regard to both development and accessibility to treatment, this section will focus exclusively on group based interventions.

Indicated prevention. Indicated prevention programs target specific populations who are displaying symptoms of an illness or meet clinical criteria. Given the strong association between resilience factors and a clinical diagnosis of depression or anxiety, this section focuses on indicated prevention programs that seek to improve stress coping, interpersonal skills, and mastery in individuals with diagnoses or clinical symptoms of depression or anxiety.

Interventions such as Mindfulness Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT) aim to improve individuals awareness of the present moment and cope with stress through mindfulness and meditation practices (S. Evans et al., 2008; Matousek, Dobkin, & Pruessner, 2010; Matousek, Pruessner, & Dobkin, 2011; Ree & Craigie, 2007; Segal, Teasdale, Williams, & Gemar, 2002). MBSR and MBCT have been shown to promote reductions in physical symptoms such as pain and psychological symptoms including reductions in depression, anxiety, and perceived stress and reduce the likelihood of depression relapse (S. Evans et al., 2008; Kenny & Williams, 2007; Merkes, 2010; Ree & Craigie, 2007; Segal et al.,

2002; Williams et al., 2014). While these programs have been shown to be effective at improving stress coping and reducing the negative impact of stress on health, many individuals do not have the time, resources, or accessibility required to participate in an intensive meditation course. Further, leaders must have extensive personal experience of mindfulness practice and attend teacher-led medication retreats, further limiting accessibility to this program (Grabovac & Burrell, 2018; Kabat-Zinn, 2006; Segal et al., 2002). While some data suggests that MBSR and MBCT may be effective for children and adolescents, research is limited (Burke, 2010; Mostafazadeh, Ebadi, Mousavi, & Nouroozi, 2019; Zack, Saekow, Kelly, & Radke, 2014). Adapting MBSR for youth requires special accommodations to account for differences in attention span, cognitive capacities, language abilities, and reliance on others for children compared to adults (Saltzman & Goldin, 2008; Semple, Lee, Rosa, & Miller, 2010). This developmental tendency to rely on others suggests that including parents and teachers on the treatment and home practice is vitally important for children and adolescents (Bögels, Hoogstad, van Dun, de Schutter, & Restifo, 2008; Saltzman & Goldin, 2008). The modifications and social support required to implement these interventions with youth impact the accessibility of these programs.

The basic teachings of cognitive and behavioral therapies have informed a number of treatments modalities. Many of these interventions follow the theoretical framework proposed by Lazarus & Folkman (1984) that suggests individual coping behaviors influence the impact of stress exposure on health. Cognitive and behavioral stress management interventions appear to be effective for reducing perceived stress and internalizing symptoms and improving coping strategies, self-efficacy, and perceived social support, particularly among adults with chronic illnesses (J. L. Brown & Vanable, 2008). However, the lack of a core curriculum that remains

constant across interventions and the extensive variability in intervention focus, methodology, sample size, and measurement methods make it challenging to compare results across studies. Clear definitions of the components of such broad interventions are needed in order to identify the active ingredients of stress management programs and study the interventions empirically across sites and populations.

Social support represents another resilience factor imperative for well-being across the life span. Social and interpersonal skills training programs seek to improve social skills among children with emotional and behavioral disorders and learning disabilities (Maag, 2006; Young et al., 2011; Young et al., 2016). These interventions often focus on improving interpersonal skills and Theory of Mind, which refers to the ability to understand that individuals have different beliefs, desires, or opinions and these internal experiences may predict and explain social behaviors (Astington, 2001; Caputi & Schoenborn, 2018). One's ability to comprehend Theory of Mind influences abilities such as perspective taking and inferring others' mental states and deficits in these skills are associated with impaired social relationships and internalizing psychopathology (Caputi & Schoenborn, 2018). While these programs can be effective, the effectiveness of social skills training is limited due to a lack of focus on replacing undesirable behaviors (e.g. hitting when angry) with a more helpful behavior serving the same purpose, individual differences in causes and types of social deficits, and an over-reliance on individual treatment for a problem that occurs only during interactions with others (Maag, 2006).

Overall, the indicated prevention interventions discussed show great promise for reducing rates of internalizing symptoms and perceived stress amongst individuals who already show symptoms, have clear deficits in certain areas (e.g. social skills) and meet clinical criteria for a mental or physical health condition. However, illnesses such as depression are highly recurrent.

Once a person has a depression episode, there is high risk for reoccurrence (Hardeveld, Spijker, De Graaf, Nolen, & Beekman, 2010) and that risk increases when individuals experience depressive episodes in youth and adolescents (Brent & Weersing, 2015). Therefore, preventing the onset of illnesses such as depression and anxiety in the context of stress exposure may more effectively foster resilience across the lifespan.

Selected prevention. Selected prevention studies offer programs to individuals who exhibit risk factors for illnesses such as anxiety and depression. For example, traumatic and chronic stress exposure can be considered a risk factor for internalizing disorders. A number of the previously mentioned indicated prevention treatments have also been implemented as selected prevention interventions. For instance, MBSR and MBCT have been associated with reduced depression, anxiety, and perceived stress when disseminated among populations experiencing significant stress (Chiesa & Serretti, 2009; Semple et al., 2010).

In school-aged children and adolescents, programs such as the Penn Resiliency program (Brunwasser, Gillham, & Kim, 2009; Cutuli et al., 2013), the EMOTION program (Martinsen et al., 2019), and the Coping with Stress intervention (Beardslee et al., 2013) have been shown to reduce symptoms of depression and anxiety and improve overall functioning. Interestingly, follow-up studies investigating a variant of the Coping With Stress intervention have shown that parental depression moderates the impact of the invention on health (Beardslee et al., 2013). Among adolescents with a depressed parent, rates of depression did not differ between the intervention and control groups. Parent-child relationship quality is a strong predictor of well-being in youth and parental depression has been shown to impact parent-child relationship quality (Branje et al., 2010). Studies of CBT effectiveness suggest that participation in CBT shows the greatest effects when the parents are involved with their child's treatment (Manassis et

al., 2014). Involving supportive adults who can assist in the child's learning and practice of the desired skills may provide the best method to foster resilience in youth. For instance, the Kids Club™ program aims to improve well-being among children exposed to intimate partner violence and incorporates weekly child only sessions and optional parenting sessions (Graham-Bermann, Howell, Lilly, & Devoe, 2011; Graham-Bermann, Lynch, Banyard, DeVoe, & Halabu, 2007; Graham-Bermann, Miller-Graff, Howell, & Grogan-Kaylor, 2015; Howell, Miller, Lilly, & Graham-Bermann, 2013). Children whose parents were also participating in the parenting groups demonstrated the greatest reduction in internalizing problems (Graham-Bermann et al., 2007). This intervention shows great promise due to its broad focus on multiple factors associated with resilience (e.g. coping skills, social skills, attitudes). While this program was designed specifically for children who have experienced intimate partner violence, it is possible that youth who have experienced traumatic events or increased stress exposure may also benefit from similar interventions.

Taken together, the literature suggests that selected prevention programs can be effective at improving well-being among youth. However, many of these programs focus on one modality, such as mindfulness, CBT, or interpersonal skills, which may limit the generalizability of the interventions. Broader interventions such as the Kids Club™ may better cater to individual differences in resilience factors and promote greater well-being overall. However, these interventions are applicable only for specific groups (i.e. kids exposed to domestic violence). Since all people experience stress to some degree, broader preventative interventions that cater to all individuals regardless of context or life experiences may foster resilience for a greater number of individuals.

Universal prevention. Universal prevention programs aim to mitigate negative outcomes for all individuals, regardless of risk status. In order to prevent the developmental increase in psychopathology during adolescence and early adulthood, many universal prevention programs have been implemented in school settings (Spence & Shortt, 2007). Previous research has suggested that school-based universal prevention programs are not effective for all kids, and may in fact have adverse effects for some youth (Spilt, Koot, & van Lier, 2013). Implementing universal interventions is costly, both financially and in the time and resources required to adequately train leaders and administer the intervention (Spence & Shortt, 2007). Although the current literature on the effectiveness of cognitive behavioral universal prevention programs is too weak to justify the large-scale implementation (Spence & Shortt, 2007), research on the effectiveness of some programs has been promising and may be particularly helpful for certain groups of children (Muratori et al., 2015; Spilt et al., 2013).

Universal prevention programs that have shown promise in reducing internalizing and externalizing psychopathology and improving coping and social skills include the Penn Resiliency Program (Gillham, Hamilton, Freres, Patton, & Gallop, 2006; Jaycox, Reivich, Gillham, & Seligman, 1994), The Coping Power Program (Muratori et al., 2015) and the Good Behavior Game (Spilt et al., 2013). However, the effectiveness of these programs may vary based on whether they are led by school or research personnel and on the social and emotional risk profiles of the children involved (Brunwasser, Gillham, & Kim, 2009; Spilt et al., 2013). For instance, the Good Behavior Game has not been effective for children demonstrating externalizing problems in combination with internalizing, attention, or social problems. This finding is important because externalizing behaviors such as aggression often co-occur with symptoms of internalizing, attention, or social problems (Spilt et al., 2013). While the GBG's

focus on promoting good behaviors appears to be helpful, this intervention does not address the antecedents of problem behaviors nor individual differences in the availability of social and coping skills. Broader interventions that include the collaborative nature of the GBG yet also teach social and copings skills may be more effective at reducing symptoms among youth experiencing more significant symptomatology.

A component of many interventions, psychoeducation refers to providing information about normative experiences and research related to negative life experiences and well-being. For instance, one intervention sought to teach adolescents about normative events, non-normative events and hassles common to the adolescent experience (Rice, Herman, & Petersen, 1993). The intervention also taught emotional, cognitive, and behavioral responses shown to be adaptive in the face of challenges. Participants in this intervention reported significant increases in perceived coping abilities, perceived control over challenging school and interpersonal events and improved relationships with peers and family members. The effectiveness of psychoeducation suggests that interventions including a psychoeducational component may be more effective at fostering resilience compared to interventions without such a component.

Taken together, the research on indicated, selected, and universal prevention programs suggest that these programs may be effective in improving factors associated with resilience, including coping skills and social support. The effectiveness of these interventions may be limited based on issues related to accessibility, breadth of skills and topics, and the risk profiles of the individuals involved. Programs that include psychoeducation, a parental component, and cover a broad range of skills including coping and social skills, may offer the most promise for promoting resilience in the face of subsequent stress exposure.

Gaps

A significant amount of research has studied resilience across the lifespan. Rather than conceptualizing resilience as a personality trait, current best practices suggest that researchers should measure resilience through assessing mental health, behavioral outcomes, and perceived stress load after the experience of adversity (Chmitorz et al., 2018; Kalisch et al., 2015). Variations in the impact of stress on health may stem from differences in the type of stressor (e.g. early life stress, recent life stress, and daily hassles), individual differences in the perceptions of stress, and the availability of internal and external resources including social support, coping skills and feelings of mastery. Group-based interventions have been shown to improve coping skills, social skills, perceived social support, perceived stress, and symptoms of anxiety and depression. Changes in the ability to utilize coping skills and social support may provide a mechanism by which interventions promote resilience in the face of negative life experiences. Broad interventions that teach a multitude of skills related to resilience may be more effective for stress reduction than interventions that only focus on one area (e.g. social skills, mindfulness) (Kraag, Zeegers, Kok, Hosman, & Abu-Saad, 2006). Broader training may provide individuals with a greater number of skills overall, increasing the likelihood that they can effectively cope with the varied challenges of their environment. Further, broader interventions may improve access to care as these interventions may better address individual differences in skills deficits and presenting concerns. Access to care is a major concern in intervention research and new interventions should be designed in a manner that promotes equitable access and likelihood of treatment response among individuals of different ages, races, ethnicities, genders, socioeconomic statuses, and presenting concerns.

Current Study

This dissertation sought to understand factors associated with resilience and examined whether novel skills-based group interventions bolstered resilience factors and improved overall well-being in the face of adversity. This dissertation took a life-course perspective to understand factors associated with resiliency in children, teenagers, and adults. **Study one** investigated factors associated with resilience in 12 to 16-year-old adolescents. This study investigated whether perceived social support or mastery influence self-reported ratings of stress, anxiety, and depression after exposure to recent stress. Stress was measured via subjective ratings from the adolescent, consensus ratings generated based on life event context, and stress sensitivity, which reflected the discrepancy between subjective and consensus ratings, in order to determine how differences in perceived stress relate to resilience factors (e.g. mastery and social support) and symptoms of anxiety and depression. **Study two** explored whether a novel skills-based group intervention for kids, known as the Kids Empowerment Program™ (KEP), influenced self-reported feelings of anxiety and depression and parent-child relationship quality. I also investigated whether the KEP influences self-reported coping skills and whether changes in coping skills mediated the relationship between the intervention and anxiety, depression, and parent-child relationship quality. **Finally, study three** investigated the efficacy of a novel skills-based group intervention for adults, known as Mood Lifters™, to reduce self-reported perceived stress, anxiety, and depression in the context of greater exposure to daily hassles and negative life events. I investigated whether the Mood Lifters™ intervention impacted self-reported coping skills and social support, and whether these resilience factors influenced the relationship between the intervention and overall well-being.

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Chapter 2 The Moderating Role of Social Support and Mastery on the Association Between Exposure to Negative Life Events and Adolescent Psychological Well-being

The adolescent transition is characterized by increased stress exposure and greater rates of internalizing psychopathology (Roberts & Lopez-Duran, 2019). Greater exposure to negative life events represents a significant risk factor for the development of internalizing psychopathology among teens (LeMoult et al., 2020; Michl, McLaughlin, Shepherd, & Nolen-Hoeksema, 2013; Spinhoven et al., 2010; Stikkelbroek, Bodden, Kleinjan, Reijnders, & van Baar, 2016). However, not all adolescents exhibit negative outcomes when exposed to stress, suggesting that resilience is possible. Studies of resilient adolescents have found that increased feelings of social support and mastery are associated with lower anxiety and depression (Bovier, Chamot, & Perneger, 2004; Chu, Saucier, & Hafner, 2010; Southwick et al., 2016). However, few studies have examined whether greater social support or mastery influence the likelihood of resilience among adolescents exposed to negative life events. I seek to determine whether social support and mastery are associated with reduced anxiety and depression among individuals exposed to greater stress.

An individual's stress sensitivity, that is their tendency to experience negative affect or distress in response to stressful event, may explain variations in vulnerability and resilience (Bale, 2006). In order to investigate individual differences in reactivity to stress, researchers often assess an individual's *perceived* stress (Evans et al., 2013; Hong et al., 2018; Kumar et al., 2015; Lehrer, Steinhardt, Dubois, & Laudenslager, 2020; McLaughlin, Conron, Koenen, & Gilman, 2010). Importantly, stress sensitivity and perceived stress are not equivalent because

variability in perceived stress may not accurately reflect the actual threat experienced by an individual. For example, if an individual is exposed to a significant stressor, such as a traumatic event, reporting high perceived stress does not reflect high stress sensitivity. In contrast, stress sensitivity is contextual in that it reflects whether the individual's perception is lower, equal to, or greater than expected given the nature of the stressor (Menne-Lothmann et al., 2012). Recent advances in contextual stress assessment allow us to properly measure stress sensitivity by comparing a teen's perception of stress against the expected response of the average teenager as determined through a structured clinician-consensus anchor rating approach (Williamson et al., 2003). In this dissertation, I will examine whether variability in stress sensitivity predicts depression and anxiety as well as whether social support and mastery contribute to individual differences in stress sensitivity.

Stress Exposure in Adolescence

Adolescence is associated with increased stress exposure (Collins & Steinberg, 2007; Roberts & Lopez-Duran, 2019) and greater rates of internalizing psychopathology (Bor, Dean, Najman, & Hayatbakhsh, 2014). Teenagers report greater social and family difficulties and academic concerns as sources of stress (Huan, Yeo, Ang, & Chong, 2006; Torsheim & Wold, 2001). In addition, the fear of peer evaluation increases significantly during the adolescent transition (Somerville, 2013), suggesting that greater exposure to interpersonal difficulties may be perceived by adolescents as particularly stressful. There are also gender differences in the type of stressors experienced by adolescents. Girls experience more social, family, peer, and intimacy stressors and report greater perceived stress than boys (Wagner & Compas, 1990). This differential exposure to challenging and stressful events may account for the greater rates of depression among adolescent girls (Hampel & Petermann, 2006; Petersen, Sarigiani, & Kennedy,

1991). The developmental increase in stress exposure combined with the normative maturational and hormonal changes of adolescence may partially explain increases in symptoms of internalizing psychopathology during the adolescent transition (Roberts & Lopez-Duran, 2019).

Factors Associated with Resilience

While rates of internalizing psychopathology increase during this period, only 35% of adolescents will develop clinically significant symptoms of anxiety or depression (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). The resilience of the majority of adolescents during this stressful developmental transition suggest that coping with stress effectively is possible. Although a number of resilience factors have been associated with greater well-being in the context of exposure to negative life events (Asselmann, Wittchen, Lieb, & Beesdo-Baum, 2017; Bonanno & Diminich, 2013; Hampel & Petermann, 2006), the present study focuses on social support and mastery.

Social support refers to the different types of assistance or help that individuals receive from other people (Cohen, 2004). Social support may buffer against the negative effects of stress and promote resilience (Rueger, Malecki, & Demaray, 2008). Well-adjusted adolescents were found to have more positive relationships with their parents, teachers, and peers compared to adolescents with greater depressive symptoms (Bean, Pingel, Hallqvist, Berg, & Hammarström, 2019; Branje, Hale, Frijns, & Meeus, 2010; Kennedy, Bybee, Sullivan, & Greeson, 2010; Rueger, Malecki, Pyun, Aycock, & Coyle, 2016). The importance of social support increases across the adolescent transition and peer social support appears to be strongly associated with well-being (Chu et al., 2010). The protective nature of social relationships in adolescence may be especially important for individuals experiencing higher levels of stress, such as those experiencing socioeconomic disadvantage (Wight, Botticello, & Aneshensel, 2006). Peer support

in adolescence has important implications for adolescent identity formation (Meeus & Dekovic, 1995) and fosters a sense of belonging which has been shown to increase academic engagement and performance (McNeely & Falci, 2004). Although many studies suggest that peer support is beneficial during this developmental stage, other studies have found an association between strong peer support and higher levels of problem behaviors and distress (Kerr, Preuss, & King, 2006; Rueger et al., 2008). For instance, adolescents who associated with deviant or suicidal peers may be more likely to engage in antisocial activities such as substance use or delinquency (Dishion & Owen, 2002) and experience suicidal ideation themselves (Prinstein, Boergers, & Spirito, 2001; Prinstein, Boergers, Spirito, Little, & Grapentine, 2000). The complicated nature of peer social support suggests that additional sources of support may better support adolescent well-being. Familial support has consistently been associated with well-being and positive adjustment among adolescents (Cicognani, 2011; Kerr et al., 2006; Prinstein et al., 2001; Rueger et al., 2008). Importantly, support from parents and peers appear to be independent of one another in that peer support does not compensate for lack of parental support (Helsen, Vollebergh, & Meeus, 2000; van Beest & Baerveldt, 1999). Therefore, considering support from family and peer relationships may provide the best measure of social support resources in adolescence.

The association between social support and well-being may vary based on gender (Rueger et al., 2008). Boys and girls tend to use social support differently. Boys tend to have larger support networks, a greater balance of male and female friends (Feiring & Lewis, 1991), and tend to self-disclose about difficult situations only to share information and seek distraction, rather than to seek support (Belle, Burr, & Cooney, 1987). On the other hand, girls demonstrate a greater preference for female friends over time (Feiring & Lewis, 1987), spend more time with

peers, and confide in their social support network in order to gain support and help with their problems (Belle, Burr, & Cooney, 1987; Rueger, Malecki, & Demaray, 2010). Adolescent females tend to invest more time and effort into social relationships and report greater perceptions of social support compared to males (Rueger et al., 2008). Although boys and girls tend to report similar levels of familial support, females tend to perceive greater support from peers compared to parents whereas males identify familial support as stronger than peer support (Malecki & Demaray, 2003; Rueger et al., 2008). Gender differences in the use and perception of social support may also influence the effectiveness of social support at promoting resilience. While some studies suggest that social support is beneficial for adolescents regardless of gender (Colarossi & Eccles, 2003), findings are inconsistent. For males, greater peer social support has been linked with both improved adjustment (Bogard, 2005; Dunn, Putallaz, Sheppard, & Lindstrom, 1987) but also with increased depressive symptomatology (Kerr et al., 2006). Whereas support from peers may be particularly protective for males (Rueger et al., 2010), global social support and familial support may be more beneficial for females than support from peers (Dunn et al., 1987; Landman-Peeters et al., 2005; Rueger et al., 2010). Thus, research on social support in adolescence should consider variability based on gender.

Feelings of mastery may also influence adolescent's perception of life events. Mastery refers to the extent to which an individual views their situation as being within their control (Pearlin & Schooler, 1978). Individuals with greater mastery feel empowered to influence their environment and secure their desired outcomes (Pudrovska, Schieman, Pearlin, & Nguyen, 2005). The belief that one has control over their experiences is associated with better problem solving abilities, improved academic achievement and peer relations, and fewer symptoms of depression (Assari & Caldwell, 2017; Parto & Besharat, 2011; Ross & Broh, 2000). Mastery has

been shown to protect against the effects of adversity such as economic hardship (Caputo, 2003). Individuals may gain mastery through practicing their skills and successfully managing a stressor (Southwick & Charney, 2012). Gaining mastery, and therefore confidence in one's ability to deal with stress, allows for a shift in which perceived threats become perceived challenges and increases problem-oriented coping, motivation, and perseverance. Coping with a stressor in this way buffers against the risk for stress-related disorders (Southwick & Charney, 2012). Gender may influence reports of mastery. In both adulthood and adolescence, females tend to report lower levels of mastery compared to males (Sagone & Caroli, 2014; Zalta & Chambless, 2012). Therefore, gender should be considered while investigating whether feelings of mastery promote resilience among stress-exposed adolescents.

Stress Sensitivity

Stress sensitivity refers to individual differences in the magnitude of a response to a stressor (Bale, 2006). Stress sensitivity is commonly measured in the laboratory using biomarkers, such as stress hormones, after exposure to the same stressor (Henckens et al., 2016). Emotional or behavioral indices of stress sensitivity are more difficult to obtain in the natural environment. Researchers often measure perceived stress, but such measures are limited in that they do not capture whether the magnitude of the stress response is greater, lower, or in line with the actual levels of stress experienced. In order to measure adolescent's stress sensitivity to past stressful events researchers might examine how the adolescent's subjective reports of stress severity to an event they experienced compares to the expected response given the context and details of the event. The Stressful Life Events Schedule for Children and Adolescents (SLESCA; Williamson et al., 2003) identifies negative life events experienced in the past year and the adolescent's subjective rating of stress conferred by each event. Further, through a semi-

structured interview, researchers gather information about the context surrounding each life event and assign a consensus measure of stress severity using a standardized set of ratings. These consensus ratings allow us to compare the adolescent's own subjective report of stress against what is expected of the average teenager given a similar experience.

Biological indices of stress sensitivity have been extensively used as predictor of mental health outcomes (Doom & Gunnar, 2013; Faravelli et al., 2012; Hulme, 2011; Turner et al., 2020) but few studies have used contextual interviews to examine stress sensitivity as a mechanism of stress vulnerability. In order to close this gap, in this dissertation I will examine whether stress sensitivity as measured by the SLESCA predicts depression or anxiety in youth exposed to negative life events. Furthermore, although greater social support and feelings of mastery have been associated with reduced depression and anxiety in the face of adversity, the mechanisms by which these factors promote resilience are not clear. One possible explanation is that resources such as social support and mastery buffer against the negative effects of stress exposure by reducing stress sensitivity (Asselmann et al., 2017; Bovier et al., 2004; Cohen & Wills, 1985). For example, the end of a significant friendship may be less distressing to a teenager who has a large social support group compared to an adolescent with few friends. In this example, the resources the individual has to cope with the event impacts the individual's perception of the event, influencing stress sensitivity and the associated mental health outcomes (Asselmann et al., 2017; Hampel & Petermann, 2006). Therefore, I will examine whether social support and mastery predict stress sensitivity in adolescents exposed to negative life events.

Aims & Hypotheses

Study one of this dissertation seeks to examine the impact of social support and feelings of mastery on adolescent symptoms of anxiety and depression. Given previous research

suggesting greater social support and mastery are associated with resilience, I hypothesize that greater social support and greater mastery will be associated with reduced symptoms of anxiety and depression. This dissertation also aims to investigate the relationship between stress sensitivity and internalizing psychopathology. In order to assess stress sensitivity, this study measures stress exposure through past year negative life events. Using the SLESCA (Williamson et al., 2003), life events are given *subjective* ratings of stress which reflect the adolescents' self-reported stress and *consensus* ratings of stress assigned by researcher consensus based on context. Discrepancies between consensus and subjective ratings, referred to as the stress sensitivity, will be calculated to investigate the relative impact of subjective perceptions of stress on health. I hypothesize that adolescents reporting greater subjective compared to consensus ratings (i.e. high stress sensitivity) will report greater symptoms of anxiety and depression, whereas adolescents reporting less subjective compared to consensus stress (i.e. low stress sensitivity) may be more likely to demonstrate resilience. Finally, this study seeks to examine whether greater social support and feelings of mastery are related to subjective or consensus ratings of stress and stress sensitivity and thus may provide a mechanism by which these factors promote resilience in the face of adversity. I hypothesize that those with greater social support and higher levels of mastery will show reduced stress sensitivity in the form of lower subjective stress than researcher-consensus ratings for the same events. The specific aims of this study are to:

1. Assess the impact of social support and feelings of mastery on symptoms of anxiety and depression.
2. Examine whether social support and feelings of mastery are related to subjective stress, consensus stress, and stress sensitivity (subjective-consensus discrepancy).

3. Investigate the relative impact of subjective stress, consensus stress, and stress sensitivity on symptoms of anxiety and depression.

Method

Participants

Participants include 117 adolescents, aged 12-16 years old, who were recruited from southeast Michigan through flyers placed in public spaces and advertisements on a university health website. 62 participants (53%) had a parent with a history of depression (high risk group) and the remaining participants did not have a parental history of depression (low risk group). Inclusion criteria for this study were: age 12-16 years old, having the ability to read and speak English, and one parent with or without a history of depression who was also interested in participating. Exclusion criteria included: adolescent or parent history of psychosis and adolescent diagnosis of Autism, Down's syndrome, or significant neurological or medical conditions (e.g. cancer, endocrine disorder, cerebral palsy).

Procedures

Adolescents and their parents participated in a single laboratory visit at the University of Michigan Department of Psychology, conducted between 1400h and 1800h, lasting approximately 4 hours. The current study comes from a larger study of adolescents at risk for depression. Adolescent participants and their parents provided consent/assent to participate, completed self-report questionnaires, and participated in clinical interviews. The adolescent also completed a well-established social evaluative stress task, the Trier Social Stress Test (Kirschbaum, Pirke, & Hellhammer, 1993). Since this task will not be utilized in the current study, methods are presented elsewhere (Micol, Roberts, Taylor-Cavelier, Geiss, & Lopez-Duran, 2019). Informed consent and assent was obtained from all individual participants and

their parents in this study. This study was approved by the University of Michigan Institutional Review Board. Participants were compensated with a $50 gift card for their participation.

Measures

Demographic and Lab visit Questionnaire. Participants completed a demographic and lab information questionnaire which included questions about age, gender (male or female), religious affiliation, family structure, parental education, employment and income, birth complications and developmental milestones, questions about utilization of mental and physical health services, and what time the teen awoke that morning and when they last ate.

Predictors

Perceived Social Support. Adolescents completed the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988). This 12-item questionnaire measures how one perceives their social support system. The MSPSS has been found to have acceptable internal and test-retest reliability (Canty-Mitchell & Zimet, 2000; Zimet et al., 1988; Zimet, Powell, Farley, Werkman, & Berkoff, 1990). In the present study, Cronbach alphas were for 0.907 the total score, 0.948 for the friends subscale, 0.861 for the family subscale, and 0.924 for the significant other subscale.

Mastery. Adolescents completed the 7-item Mastery Scale (Pearlin & Schooler, 1978) which measures the extent to which a person perceives himself or herself to be in control of events and ongoing situations. Adaptations of this scale have been found to have acceptable reliability (Eklund, Erlandsson, & Hagell, 2012; Togari & Yonekura, 2015). In the present study, the Cronbach's alpha for the scale was 0.768.

Psychological outcomes

Depression Symptoms. Adolescent participants and their parents reported on adolescent current depression symptoms through completion of the *Children's Depression Inventory* Self

and Parent report versions (CDI; Kovacs, 1992). The reliability of this scale has been found to be acceptable (Smucker, Craighead, Craighead, & Green, 1986; Sun & Wang, 2015). In the present study, the Cronbach's alpha for the scale was 0.787.

Anxiety Symptoms. Adolescent participants completed the Screen for Child Anxiety Related Emotional Disorders-Revised (SCARED-R; Birmaher et al., 1999). This 41-item questionnaire assesses for symptoms of anxiety that correspond with DSM-IV diagnoses. This scale has acceptable validity and test-retest reliability (Behrens, Swetlitz, Pine, & Pagliaccio, 2019; Muris, Merckelbach, Ollendick, King, & Bogie, 2002). In the present study, the Cronbach alphas were 0.947 for the total scale, 0.885 for the panic subscale, 0.913 for the generalized anxiety subscale, 0.764 for the separation anxiety subscale, 0.888 for the social phobia subscale, and 0.682 on the school phobia subscale.

Clinical Interviews

Parent Diagnostic Interview. In order to assess for parental history of depression, trained clinicians conducted the *Structured Clinical Interview for DSM-5 Axis I Disorders* (SCID-5; First, Williams, Karg, & Spitzer, 2015) with the parent. This semi-structured interview includes probes and anchor points for symptoms and diagnosis of DSM-5 disorder criteria. This interview provided verification that the parent has met criteria of major depression in the past or currently allowing us to place participants into the High Risk (HR; parental depression was present) and Low Risk (LR; parental depression absent) groups. The interview was conducted by graduate students in clinical psychology who were extensively trained by the Principal Investigator of the study. The Principal Investigator also leads the clinical diagnostic training for the doctoral program in clinical psychology at the University of Michigan. All cases were

reviewed by the study clinical staff and the PI, and diagnoses were derived using the best estimate procedures via clinical consensus.

Subjective Stress, Consensus and Stress, and Stress Sensitivity. Adolescents and their parents completed The Stressful Life Events Schedule for Children and Adolescents (SLESCA; Williamson et al., 2003). The SLESCA contains a questionnaire that was used as a screener, and a semi-structured interview given to children and their parents about stressful events that were ongoing and those that have occurred over the previous year. Based on structured follow-up questions from the researchers, children and their parents provided detailed descriptions of life events experienced in the last year and assigned subjective ratings quantifying the impact of that life event. This screener and interview were conducted with the child and parent separately at the initial interview. Later, the research team discussed each event and generated a rating of the consensus stress conferred by the event using a provided rating system (Williamson et al., 2003). Consensus stress ratings were determined based on contextual information provided by the child, parent, or both, using severity anchors included in the interview scoring manual. Although the parents also provided subjective stress ratings, this study is focused on the child's perceptions of stress and therefore only the child subjective stress ratings are included in the current study. Finally, a stress sensitivity index was created by subtracting the consensus severity ratings from the adolescent-reported subjective ratings such that high scores reflect greater subjective report compared to the consensus rating (i.e. high stress sensitivity).

Data Analytic Strategy

Initial models will examine the association between the parental history of depression, age, gender, and race/ethnicity with key variables (i.e. anxiety, depression, and stress sensitivity scores). Any covariates that are significantly associated with an outcome variable will be

included in all analyses using that outcome variable. Cronbach's alphas will be calculated as measures of each scale's internal consistency. For continuous variables, means (standard deviations) or medians (ranges) will be reported. Variables will be assessed for normality and measures with a kurtosis greater than 1 or less than -1 or a skewness greater than 3 or less than -3 will be log transformed prior to running regression analyses. Mixed effects models will be used to assess the relationship between social support, mastery, and symptoms of anxiety and depression. Stress sensitivity scores will be calculated by subtracting subjective ratings of stress from consensus ratings. Thus, positive discrepancy scores will reflect greater subjective compared to consensus ratings of stress and greater stress sensitivity whereas negative scores will result from lower subjective compared to consensus ratings of stress indicating lower stress sensitivity.

For Aim 1, mixed effects models will be used to assess the relationship between social support, mastery, and symptoms of anxiety and depression to determine whether these factors are associated with reduced internalizing psychopathology. For Aim 2, mixed effects models will examine whether social support and mastery relate to subjective stress, consensus stress, and stress sensitivity to identify whether these resources predict reductions in subjective or consensus stress ratings and stress sensitivity. For Aim 3, mixed effects models will also be used to assess whether subjective and consensus stress or stress sensitivity scores relate anxiety or depression to determine the association between metrics of stress exposure, stress sensitivity, and psychological well-being. Finally, exploratory analyses will examine whether the interaction between social support, feelings of mastery, and subjective or consensus stress predict psychological well-being. A level of 0.05 will be used to assess statistical significance. Promising trends will be identified. All analyses will be conducted using SPSS and SAS.

Results

Sample characteristics

117 adolescents (68 female) ages 12-16 years old (mean 13.91 years) participated this in this study. 62 adolescents had a biological parent with a history of depression and were in the 'high risk' group and the other 55 participants did not have a biological parent with a history of depression and made up the 'low risk' group. The majority of the participants identified their race as White (74%; see Table 2.1 for full breakdown of race). Given the significant proportion on individual identifying as white in this sample, the covariate analysis of race compared white (n = 87) versus non-white (n = 26) participants. 2 participants had missing data for mastery (n = 1) and anxiety (n = 1) so regression analyses including these variables include 115 or 116 participants (depending on if the analysis includes both mastery and anxiety or just one of these variables).

Means and standard deviations of resilience factors (i.e. social support, mastery), stress measures (i.e. total subjective stress, total consensus stress, and stress sensitivity), and psychological outcomes (i.e. depression and anxiety) pre-transformation are presented in Table 2.2. Assessment of normality revealed that the total scores for depression, total subjective stress ratings, social support from friends, and stress sensitivity all had kurtosis greater than 1. Kurtosis was improved by taking the log of subjective stress ratings (kurtosis = 0.62) and squaring the social support from friends (kurtosis = -0.37) and depression variables (kurtosis = 1.2). Kurtosis of the stress sensitivity score was not improved by squaring or log transforming the variable and thus was not transformed (kurtosis = 3.34). Correlations between all continuous variables are presented in Table 2.3.

Covariate Analysis

Regression analyses examined whether age, gender, parental history of depression (risk), and race were associated with consensus or subjective ratings of stress, stress sensitivity scores, anxiety, or depression (see Table 2.4). Given the high number of individuals identifying their race as white in our sample, race was coded as white (n = 87) and non-white (n = 26). Racial information was missing for 4 participants. There were no significant differences in anxiety, depression, subjective stress ratings, consensus stress ratings or stress sensitivity scores based on age or race (see Table 2.4). We observed significant differences as a function of risk in that individuals with a parental history of depression demonstrated greater symptoms of anxiety (b = 9.11, p = 0.0007), depression (b = 56.16, p = 0.017), as well as greater subjective (b = 0.340, p = 0.023) and consensus stress (b = 4.499, $p < 0.0001$). We also found significant gender differences. Compared to males, females exhibited greater symptoms of anxiety (b = -14.94, $p <$ 0.001), depression (b = -59.52, p = 0.012), and greater subjective (b = -0.553, p = 0.0002) and objective stress ratings (b = -4.398, $p < 0.0001$). Risk and gender were not associated with variations in stress sensitivity scores (see Table 2.4). Since risk and gender were strongly related to both outcome variables and subjective and consensus measures of stress, risk and gender were included as covariates in all models. Further, given previously reported gender differences in social support and mastery (Rueger et al., 2010; Sagone & Caroli, 2014), exploratory analyses will investigate whether gender moderates the relationship between mastery, social support, subjective or consensus ratings of stress, stress sensitivity, and depression and anxiety symptoms. Examination of variations based on parental history of depression is outside the scope of the present study and will be examined in future studies by our lab.

Aim 1: Association Between Social Support, Mastery, and Symptoms of Anxiety and Depression

Social Support. There were no significant gender differences in total social support (b = 0.655, p = 0.6718), family social support (b = 0.104, p = 0.8497), or friends support (b = -8.422, p = 0.6801). Regression analyses examined whether social support was associated with symptoms of anxiety or depression. All models controlled for risk and gender. Social support was not related to symptoms of anxiety (see Table 2.5). We observed a significant association in which individuals reporting greater total social support reported reduced symptoms of depression (b = -4.962, p = 0.0003) (see Figure 2.1). Greater social support from friends and family was also associated with reduced symptoms of depression (family social support: b = -11.484, p = 0.004; friend social support: b = -0.382, p = 0.0003).

Given the significant gender differences in social support and outcomes, we completed exploratory analyses to identify whether gender moderated the association between social support and outcomes. The interaction between social support and gender was not significantly related to anxiety (see Table 2.6). We observed a trend level interaction between social support from friends and gender predicting depression (b = -0.40, p = 0.0637) (see Figure 2.2). Greater social support from friends was significantly associated with reduced depression for both females (b = -0.26, p = 0.0333) and males (b = -0.65, p = 0.0003). This interaction suggests that the slopes for females and males differ from one another at trend level such that impact of social support from friendship on depression is greater for males compared to females.

Mastery. We observed a significant effect of gender on mastery in that males reported significantly greater mastery compared to females (b = 0.655, p = 0.014). Regression analyses examined whether mastery was associated with symptoms of anxiety and depression while controlling for gender and risk status. Greater mastery was significantly associated with reduced anxiety (b = -1.840, $p < 0.0001$) and depression (b = -22.1152, $p < 0.0001$) (see Figure 2.3).

Given the significant gender differences in mastery and outcomes, we completed exploratory analyses to identify whether gender moderated the association between mastery and outcomes. The interaction between mastery and gender was not significantly related to anxiety or depression (see Table 2.6).

Aim 2: Association between Social Support, Mastery, Subjective and Consensus Ratings of Stress, and Stress Sensitivity

Social Support and Subjective stress. Regression analyses examined whether social support was associated with subjective stress while controlling for risk and gender. There was no significant association between social support and subjective stress ratings (see Table 2.7). Exploratory analyses examined whether gender moderated the association between social support and subjective ratings of stress (see Table 2.8). We observed a significant moderation of gender on the association between social support total and subjective stress (b = -0.064, p = 0.0003). For males, increases in social support were associated with reduced subjective stress ratings (b = -0.043, p = 0.0024) whereas for females, increases in social support were significantly associated with *greater* subjective stress ratings (b = 0.021, p = 0.0429) (see Figure 2.4). Gender also moderated the association between social support from family and subjective stress (b = -0.181, p = 0.0002). Greater social support from family was significantly associated with reduced subjective stress for males (b = -0.11, p = 0.0022) whereas for females social support from family was not significantly associated with subjective stress (b = 0.05, p = 0.0963). Finally, gender moderated the association between social support from friends and subjective stress (b = -0.003, p = 0.0263). Greater social support from friends was significantly associated with reductions in subjective stress for males at (b = -0.003, p = 0.0034), whereas the relationship between social support from friends and subjective stress was not significant for

females (b = 0.0004, p = 0.5935).

Social Support and Consensus Stress. Regression analyses examined whether social support was associated with consensus stress while controlling for risk and gender. Although only significant at trend level, we found that total social support was associated with reduced consensus ratings of stress (b = -0.106, p = 0.071). Social support from family was not related to consensus ratings of stress (see Table 2.7). Greater social support from friends was associated with reduced consensus ratings of stress (b = -0.0117, p = 0.0084). Exploratory analyses also investigated examined whether gender moderated the association between social support and consensus ratings of stress. Gender significantly moderated the association between social support from family and consensus stress ratings (b = 1.1390, p = 0.0003) (see Figure 2.5). For males, greater social support from family was significantly associated with reduced consensus stress (b = -0.74, p = 0.0032). In contrast, for females, social support from family was not related to consensus stress ratings (b = 0.25, p = 0.2434) (see Figure 2.5). Gender did not significantly moderate the association between social support total or social support from friends and consensus stress ratings (see Table 2.8).

Social Support and Stress Sensitivity. Regression analyses examined whether social support was associated with stress sensitivity while controlling for risk and gender. There were no significant associations between social support and subjective stress ratings (see Table 2.7). We also examined whether gender influenced the association between social support and stress sensitivity (see Table 2.8). Gender significantly moderated the association between social support total and the stress sensitivity (b = -0.3290, p = 0.0151) (see Figure 2.6). For females, greater social support was significantly associated with greater stress sensitivity scores (b = 0.20, p = 0.0094), suggesting greater subjective compared to consensus threat. However, the

association between social support and stress sensitivity scores was not significant for males (b = -0.14, p = 0.1812) (see Figure 2.6). Gender also moderated the association between social support from family and stress sensitivity (b = -0.8918, p = 0.0128). For females, greater social support from family was significantly associated with greater stress sensitivity (b = 0.49, p = 0.0363), whereas the relationship between social support from family and stress sensitivity was not significant for males (b = -0.38, p = 0.1606). Gender did not significantly moderate the association between social support from friends and stress sensitivity (see Table 2.8).

Mastery and Subjective Stress. We examined whether mastery was related to subjective or consensus ratings of stress or stress sensitivity while controlling for risk and gender. Mastery was not associated with subjective or consensus ratings of stress (see Table 2.7). Exploratory analyses examined whether gender moderated the association between mastery and subjective ratings of stress. Gender did not influence the association between mastery and subjective stress (see Table 2.8).

Mastery and Consensus Stress. We investigated the association between mastery and consensus ratings of stress while controlling for risk and gender. Mastery was not significantly related to consensus ratings of stress (see Table 2.8). Exploratory analyses examined whether gender moderated the association between mastery and consensus ratings of stress. Gender did not significantly moderate the association between mastery and consensus stress (see Table 2.8).

Mastery and Stress Sensitivity. Regression analyses examined whether mastery was associated with stress sensitivity. Mastery was associated with the stress sensitivity at trend level (b = -0.311, p = 0.056), suggesting that individuals reporting greater mastery exhibited lower stress sensitivity (see Figure 2.7). Exploratory analyses examined whether gender moderated the

association between mastery and stress sensitivity. Gender did not significantly moderate the association between mastery and stress sensitivity (see Table 2.8).

Aim 3: Association Between Subjective Stress, Consensus Stress, and Stress Sensitivity scores and Symptoms of Anxiety and Depression.

Subjective Stress. Greater subjective stress was positively correlated symptoms of anxiety ($r = 0.428$, $p < 0.0001$) and depression ($r = 0.404$, $p < 0.0001$). While controlling for risk and gender, greater subjective stress was associated with greater anxiety ($b = 4.559$, $p = 0.002$) and depression ($b = 53.706$, $p = 0.0003$) (see Table 2.9 and Figure 2.8).

Consensus Stress. Greater consensus stress ratings were positively correlated with symptoms of anxiety ($r = 0.435$, $p < 0.0001$) and depression ($r = 0.403$, $p < 0.0001$). In regression analyses controlling for risk and gender, greater consensus stress was significantly related to with greater anxiety ($b = 0.57$, $p = 0.011$) and depression ($b = 7.391$, $p = 0.0008$ (see Table 2.9 and Figure 2.9).

Stress Sensitivity. We observed significant positive correlations in which greater stress sensitivity (i.e., greater subjective stress compared to consensus rated stress) was associated with greater anxiety ($r = 0.284$, $p = 0.002$) and depression ($r = 0.280$, $p = 0.002$). Likewise, in regression analyses controlling for risk and gender, greater stress sensitivity was significantly associated with greater symptoms of anxiety ($b = 0.659$, $p = 0.002$) and depression ($b = 6.421$, $p = 0.002$) (see Figure 2.10). These results indicate that individuals who reported greater subjective stress compared to consensus stress also reported greater symptoms of anxiety and depression.

Exploratory Analyses: Social Support and Mastery Moderating the Relationship Between Stress Exposure and Symptoms of Anxiety and Depression

Social Support & Subjective Stress. Regression analyses investigated whether social

support moderated the relationship between subjective stress and symptoms of anxiety and depression while controlling for risk and gender (see Table 2.10). In models without interactions, greater subjective stress, but not social support, was significantly associated with increased anxiety ($b = 4.543$, $p = 0.0025$). In contrast, greater subjective stress as well as reduced social support were all significantly associated with increased depression (see Table 2.10).

In models with interactions, gender moderated the association between subjective stress and anxiety ($b = 0.28$, $p = 0.0604$), such that subjective stress was associated with anxiety only in the context of *high* social support (see Table 2.10). This moderation effect was also observed for the interaction between social support from friends and subjective stress predicting anxiety ($b = 0.0287$, $p = 0.0338$). The interaction between subjective stress and social support was not significantly related to depression (see Table 2.10).

Social Support & Consensus Stress. Regression analyses investigated whether social support moderated the relationship between consensus stress and symptoms of anxiety and depression while controlling for risk and gender (see Table 2.11). In models without interactions, we observed a significant positive association between greater consensus stress and anxiety, but the relationship between social support and anxiety was not significant (see Table 2.11). In contrast, greater consensus stress and reduced social support were significantly associated with greater depression (see Table 2.11). The interaction between consensus stress and social support was not significantly related to anxiety or depression (see Table 2.11).

Mastery & Subjective Stress. Exploratory analyses examined whether mastery moderated the relationship between subjective stress and symptoms of anxiety and depression. Reduced subjective stress and greater feelings of mastery were both significantly associated with

reduced anxiety and depression (see Table 2.12). We also examined whether mastery moderated the association between subjective or consensus ratings of stress and anxiety, depression, or perceived stress. The interaction between mastery and subjective ratings of stress was not significantly related to anxiety or depression (see Table 2.12).

Mastery & Consensus Stress. Regression analyses investigated whether mastery moderated the relationship between consensus measures of stress and outcomes while controlling for risk and gender. Reduced consensus stress and greater feelings of mastery were significantly related to reduced anxiety and depression (see Table 2.13). We also examined whether mastery moderated the association between subjective or consensus ratings of stress and anxiety, depression, or perceived stress. The interactions between mastery and subjective or consensus ratings of stress were not significantly related to anxiety or depression (see Table 2.13).

Discussion

The present study investigated the impact of social support, mastery, stress exposure and stress sensitivity on adolescent symptoms of anxiety and depression. As hypothesized, greater feelings of mastery were associated with reduced anxiety and depression in stress-exposed youth (Aim 1). While social support was associated with reduced symptoms of depression, social support was not significantly related to anxiety, contrary to hypotheses. We also utilized both subjective ratings of stressful events provided by the adolescent and consensus ratings of the same events generated via expert consensus to create an index of stress sensitivity. This allowed us to examine whether social support and mastery impacted subjective stress, consensus stress, or stress sensitivity (Aim 2). Contrary to hypotheses, we found that greater social support from friends was not associated with subjective stress but was significantly associated with *greater* consensus stress ratings. While social support was not related to stress sensitivity, greater

mastery was related to reduced stress sensitivity (i.e. reduced subjective compared to consensus stress ratings) at trend level. Additionally, we observed significant gender differences in which greater social support was associated with reduced subjective stress and consensus stress for males. In contrast, greater social support was significantly related to greater subjective stress and stress sensitivity for females. We also examined the relative impact of subjective stress, consensus stress ratings, and stress sensitivity on depression and anxiety symptoms (Aim 3). Overall, we found that greater subjective and consensus stress ratings as well as greater stress sensitivity were related to greater symptoms of anxiety and depression. Finally, exploratory analyses examined whether social support and mastery moderated the link between stress exposure (subjective and consensus stress ratings) and symptoms of anxiety and depression. Contrary to expectations, for individuals reporting *higher* levels of social support, greater subjective stress was related to greater symptoms of anxiety at trend level. These findings suggest that social support, mastery, and stress sensitivity have important implications for the likelihood of resilience in the context of greater stress exposure. However, the similarity between findings for subjective stress, consensus stress, and stress sensitivity may suggest that stress sensitivity provides little additional information compared to metrics of perceived stress. Finally, the protective effect of social support may vary based on gender, suggesting a need for further research investigating the positive and negative effects of social support for adolescent females.

Social Support, Mastery, and Symptoms of Anxiety and Depression

The results of Aim 1 are consistent with previous research suggesting that greater social support is associated with reduced adolescent psychopathology (Bean et al., 2019; Branje et al., 2010; Kennedy et al., 2010; Rueger et al., 2016). We observed a significant association between greater social support and reduced symptoms of depression. However, contrary to expectation,

social support was not significantly related to symptoms of anxiety. Given that stressful life events are stronger predictors of depression than anxiety (Fox, Halpern, Ryan, & Lowe, 2010), it is possible that social support acts as a buffer to the effects of stress on depression but not on anxiety. Anxiety was also measured using a broad measure of anxiety symptoms. It is possible that social support may be useful for some types of anxiety (e.g., social anxiety, generalized anxiety) but not others (e.g. phobias) and thus the effect on overall anxiety is blunted when compared to depression. Future research should examine how social support relates to risk for different types of anxiety disorder symptoms and diagnoses.

We observed a significant association between greater feelings of mastery and reduced anxiety and depression. This is consistent with a long history of research showing that mastery can increase coping and reduce the impact of negative life events (Assari & Caldwell, 2017; Caputo, 2003; Parto & Besharat, 2011; Ross & Broh, 2000; Southwick & Charney, 2012). In our dataset, males reported significantly greater feelings of mastery in the current sample compared to females. These findings are consistent with previous research identifying a greater tendency for males to report feelings of mastery compared to females (Sagone & Caroli, 2014; Zalta & Chambless, 2012). Gender differences in mastery may result from gendered scripts of what personal traits are valued (Zalta & Chambless, 2012). For example, research suggest that boys are expected to manage stress on their own and perform better than girls, and are rewarded for assertiveness. In contrast, girls are encouraged to express their distress and seek support from others and are punished for assertiveness, which may lead girls to believe they have limited control over their circumstances and invite a sense of powerlessness (Zalta & Chambless, 2012). These gendered scripts may encourage boys to develop a sense of mastery, while discouraging the development of mastery in females.

Social Support, Mastery, and Measures of Stress Exposure

Contrary to hypotheses, social support from friends was associated with reduced consensus stress but was not significantly related to subjective stress or stress sensitivity. This finding may reflect the way the consensus ratings were generated. In assessing the stress conferred by a negative interpersonal event, metrics such as whether the adolescent had a large group of friends impacted consensus ratings (Williamson et al., 2003). For instance, the loss of a significant friendship was rated as less stressful for an adolescent with a large group of friends compared to an adolescent for which this was their only friend. While in theory this single event may be less stressful, adolescents with larger social support networks may experience a greater number of negative interpersonal events overall, increasing risk for negative outcomes. This hypothesis is consistent with our observation that social support moderated the association between subjective stress and greater anxiety at trend level such that for individuals reporting greater social support, greater subjective stress was associated with increased symptoms of anxiety. Greater perceived social support in this context may reflect a larger social support network and a greater likelihood of experiencing, and being strongly affected by, negative interpersonal events. Future research should examine subjective stress based on event type (e.g. interpersonal events versus other negative life events) to determine whether greater exposure to negative interpersonal events may explain the lack of association between social support and subjective stress or the stress sensitivity.

Gender also moderated the relationship between social support and metrics of stress exposure. Specifically, total social support and social support from family and friends was significantly associated with reduced subjective stress for males. However, for females, greater total social support was associated with greater subjective stress. Social support from friends or

family was not significantly related to subjective stress for females. Greater social support from family was significantly related to reduced consensus stress for males, but not for females. Finally, greater social support was associated with greater stress sensitivity scores for females, indicating greater subjective compared to consensus stress and possibly greater risk. However, for males, the association between social support and stress sensitivity scores was not significant. These data suggest that social support is generally protective for males but may be less protective, or even punitive, for females. One possible explanation is that males experience more positive benefits from a larger social support network, especially when it comes to friends (Bogard, 2005; Malecki & Demaray, 2003; Rueger et al., 2008, 2010). Overall, females have been shown to experience more social, family, peer and intimacy stressors then males (Wagner & Compas, 1990). Greater social support may reflect greater social contact overall, leading to a greater likelihood of exposure to negative interpersonal events, particularly for females. Further, males tend to utilize social support for distraction and problem solving whereas females rely more heavily on their social network for emotional support and place more importance on interpersonal relationships, which paradoxically may be harmful if such relationships are conflicted (Belle et al., 1987; Rueger et al., 2010). Therefore, negative interpersonal events may be both more frequent and perceived as more stressful for females and therefore more strongly impact mental health. These data suggest that although social support appears to promote resilience among males exposed to adversity, social support may have both positive and negative effects on female mental health.

Mastery was not associated with subjective or consensus ratings of stress. However, mastery was associated with the stress sensitivity at trend level, suggesting that individuals reporting greater mastery exhibited lower stress sensitivity. This finding is consistent with

previous research suggesting that individuals reporting greater feelings of mastery demonstrated fewer negative mental health outcomes in the face of adversity (Southwick & Charney, 2012).

Stress exposure, Stress Sensitivity, and Symptoms of Anxiety and Depression

This study replicated previous research demonstrating a link between greater exposure to negative life events and negative mental health outcomes (LeMoult et al., 2020; Michl et al., 2013; Spinhoven et al., 2010; Stikkelbroek et al., 2016). Greater subjective and consensus stress ratings were significantly related to greater symptoms of anxiety and depression. Therefore, both the adolescent's own subjective experience of stress and metrics of stress that account for context are significantly associated with negative mental health outcomes. This finding is important because the link between stress exposure and mental health could be partially attributed to greater perception of stress (and thus greater recall of stressful events) among those who have mental health problems. However, our results show that expert consensus estimates of stress severity based on contextual reports from the adolescents and their parents were also linked to greater anxiety and depression.

Further, greater stress sensitivity was associated with greater anxiety and depression, supporting our hypothesis that stress-exposed adolescents who report greater stress than would be expected given the context are at greater risk for psychopathology. However, findings for stress sensitivity, subjective stress, and consensus stress were very similar. All three metrics of stress were strongly related to symptoms of anxiety and depression. Social support was not significantly related to stress sensitivity or subjective stress, but greater social support from friends was associates with reduced consensus stress. Greater mastery was associated with ecuded stress sensitivity at trend level, but not subjective or consensus stress. Therefore, stress sensitivity may play some role in identifying factors associated with resilience at greater

expected stress, but seems to provide little information beyond metrics of perceived stress. Future research should investigate differences in effect sizes in order to determine whether stress sensitivity provides any information beyond that already captured by perceived stress.

Moderating Effects of Social Support and Mastery as the Association between Stress Exposure and Symptoms of Anxiety and Depression

Exploratory analyses explored whether social support and mastery moderated the association between subjective or consensus stress ratings and symptoms of anxiety and depression. We found that social support moderated the association between subjective stress and anxiety at trend level, such that subjective stress was associated with anxiety only in the context of *high* total social support. This moderation effect was also observed with social support from friends but not with social support from family. These observations fit with the hypothesis that adolescents with larger social groups, may experience more negative interpersonal events and be more distressed by those events, leading to greater subjective reports of stress and possibly greater symptoms of anxiety. Our study was not significantly powered to detect three-way interactions; however, future research should examine whether the moderating effect of social support on the association between subjective stress and anxiety differs based on gender. Our data suggest that social support may be associated with greater perceptions of stress for females and adolescent females have been shown to place more value on interpersonal relationships (Rueger et al., 2008; Stroud, Salovey, & Epel, 2002; Taylor, 2014) and exhibit greater symptoms of depression and anxiety compared to males (Essau, Lewinsohn, Seeley, & Sasagawa, 2010; Hankin et al., 2015; Leussis & Andersen, 2008). Therefore, greater social contact for adolescent females may have even stronger implications for perceptions of stress and internalizing psychopathology compared to adolescent males.

Limitations

While this study has a number of strengths including a large sample of adolescents and innovative measures of stress exposure, it also has some limitations. Most importantly, as a cross-sectional study, we cannot examine whether mastery, social support, or stress sensitivity predict the development of mental health difficulties after the experience of adversity. Further, adolescents who are experiencing internalizing psychopathology (Ruscio et al., 2015) or those who have limited coping skills (Berkel et al., 2009; Stikkelbroek, Bodden, Kleinjan, Reijnders, & Baar, 2016), have been show to rate life experiences as more stressful. Therefore, adolescents experiencing anxiety or depression or those with limited social support or mastery, may be more likely to report greater subjective ratings of stress. Symptoms of anxiety and depression may also influence ratings of resilience factors. For instance, adolescent girls who are experiencing significant perceived stress may rely on their interpersonal relationships more heavily for support, which may increase their likelihood of reporting high social support, as seen in this study. On the other side, depressed adolescents may exhibit overly negative views, a high need for reassurance, and may avoid social situations, increasing the likelihood of negative reactions and interpersonal difficulties in their relationships and social rejection (Ren, Qin, Zhang, & Zhang, 2018). A longitudinal study by Ren and colleagues (2018) found that as depression increased, perceived social support from peers decreased. Therefore, depression may contribute the reporting reduced social support. These bi-directional relationships suggest that more longitudinal research is needed to better understand how resilience factors present prior to exposure to negative life events influence risk for anxiety and depression.

Finally, this sample comprised of adolescents with or without a parental history of depression. While we controlled for risk in all analyses, an examination of the impact of parental

history of depression was beyond the scope the current study. Parental symptoms of depression has been shown to influence parent-child relationships and commication (De Luca, Yueqi, DiCorcia, & Padilla, 2018; Engle & McElwain, 2013; Reeb & Conger, 2009), therefore social support from families may have been differentially impacted by risk status. Future studies by our lab will continue to investigate the impact of risk on social support, mastery, metrics of stress exposure, and risk for negative mental health outcomes. Finally, children from lower income communities or traditionally marginalized racial and ethnic groups may be exposed to chronic or significant stress, including the experience of structural adversity and discrimination, increasing the likelihood of negative mental health outcomes (Reiss, 2013). Due to limited variability in social, racial, and ethnic diversity in the current sample, the impact of these factors on the association between resilience factors, stress exposure, and internalizing symptoms could not be examined. Future research is needed to determine whether the effectiveness of social support and mastery may vary based on socioeconomic status or racial or ethnic identity.

Conclusion

In conclusion, mastery and social support may promote resilience in the face of negative life events, however the effectiveness of these factors may be greater for males compared to females. Social support may actually have negative consequences for females, possibly due to the importance females place on interpersonal relationships. Stress sensitivity appears to be closely related to adolescents' subjective reports of stress and thus may not provide additional information above and beyond that measured by perceived stress. However, the association with mastery suggests that future research should examine whether stress sensitivity is beneficial for identifying resilience factors for adolescents exposed to high contextual stress. Greater mastery and social support may influence the perceived stress an adolescent experiences in response to a

negative life event, impacting the likelihood of risk or resilience. Therefore, interventions that increase feelings of mastery or the use of social support for coping may promote resilience among adolescents exposed to negative life events.

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Table 2.1 Demographics

Age	13.91 years (SD: 1.35)	**Race/Ethnicity**	
Gender		*Caucasian*	87
Female	68	*African-American*	11
Male	49	*Native American*	1
		Asian Pacific	0
Risk		*Biracial*	9
High Risk	62	*Latino/Hispanic*	3
Low Risk	55	*Other*	2
		Missing	4

Table 2.2 Means and Standard Deviations of all continuous variables

Resilience factors	Mean	SD
Social Support Total	49.7	8.2
Social Support Family	16.84	2.91
Social Support Friends	16.22	3.87
Mastery	22.07	3.36
Stress exposure		
Subjective Stress	11.01	8.64
Consensus Stress	10.38	5.87
Stress sensitivity	0.63	5.53
Outcomes		
Anxiety	20.61	14.72
Depression	16.85	3.69

Table 2.3 Correlations between all continuous variables

	Social Support Total	Social Support Family	Social Support Friends	Mastery	Subjective Stress	Consensus Stress	Stress Sensitivity	Anxiety
Social Support Total								
Social Support Family	0.738***							
Social Support Friends	0.814***	0.42***						
Mastery	0.389***	0.42***	0.237**					
Subjective Stress	-0.052	-0.104	-0.114	-0.234*				
Consensus Stress	-0.208*	-0.161	-0.251***	-0.274**	0.726***			
Stress Sensitivity	0.129	0.083	0.077	-0.167^{+}	0.602***	0.147		
Anxiety	-0.09	-0.085	-0.064	-0.535***	0.428***	0.435***	0.284**	
Depression	-0.348***	-0.294**	-0.338***	-0.621***	0.404***	0.403***	0.28**	0.589***

* Note: *** = $p < 0.001$, ** = $p < 0.01$, * = $p < 0.05$, $^{+}$ = $p < 0.08$

Table 2.4 Analysis of Covariates

	Anxiety		**Depression**			
	b(SE)	*t(df)*	*b(SE)*	*t(df)*		
Age	-1.16 (1.03)	-1.13 (113)	10.23 (8.85)	1.16 (114)		
Race	-0.85 (3.3)	-0.26 (110)	-6.11 (28.88)	-0.21 (111)		
Risk	9.11*** (2.62)	3.48 (114)	56.16* (23.11)	2.43 (115)		
Gender	-14.94*** (2.41)	-6.2 (114)	-59.52* (23.32)	-2.55 (115)		
	Subjective Stress		**Consensus Stress**		**Stress Sensitivity**	
	b(SE)	*t(df)*	*b(SE)*	*t(df)*	*b(SE)*	*t(df)*
Age	-0.01 (0.06)	0.06 (-0.11)	0.34 (0.4)	0.83 (115)	0.11 (0.38)	0.29 (115)
Race	-0.01 (0.19)	0.19 (-0.05)	0.24 (1.33)	0.18 (112)	-1.11 (1.24)	-0.89 (112)
Risk	0.34* (0.15)	0.15 (2.3)	4.5 *** (1)	4.49 (116)	-1.05 (1.02)	-1.03 (116)
Gender	-0.55*** (0.14)	0.14 (-3.83)	-4.4*** (1.02)	-4.31 (116)	-1.45 (1.03)	-1.41 (116)

* Note: *** = $p < 0.001$, ** = $p < 0.01$, * = $p < 0.05$, $^{+}$ = $p < 0.08$

Table 2.5 Association between social support, mastery, and outcomes

		Anxiety		Depression	
		b(SE)	*t(df)*	*b(SE)*	*t(df)*
Model 1	Intercept	26.63*** (7.53)	3.54 (112)	546.15*** (70.47)	7.75 (113)
	Total Social Support	-0.08 (0.14)	-0.55 (112)	-4.96*** (1.33)	-3.73 (113)
	Gender	-13.79*** (2.37)	-5.82 (112)	-50.09* (22.13)	-2.26 (113)
	Risk	6.71** (2.36)	2.84 (112)	35.46 (22.11)	1.6 (113)
Model 2	Intercept	24.62*** (3.88)	6.34 (112)	410.09*** (36.36)	11.28 (113)
	Friend Social Support	-0.01 (0.01)	-0.6 (112)	-0.38** (0.1)	-3.78 (113)
	Gender	-13.9*** (2.38)	-5.85 (112)	-57.02* (22.15)	-2.57 (113)
	Risk	6.64** (2.38)	2.8 (112)	32.79 (22.18)	1.48 (113)
Model 3	Intercept	25.63*** (7.45)	3.44 (112)	495.43*** (71.12)	6.97 (113)
	Family Social Support	-0.17 (0.41)	-0.42 (112)	-11.48*** (3.89)	-2.95 (113)
	Gender	-13.83*** (2.37)	-5.83 (112)	-52.64* (22.6)	-2.33 (113)
	Risk	6.68** (2.4)	2.78 (112)	32.64 (22.89)	1.43 (113)
Model 4	Intercept	63.97*** (7.63)	8.39 (111)	789.84*** (67.48)	11.71 (112)
	Mastery	-1.84*** (0.33)	-5.59 (111)	-22.12*** (2.91)	-7.61 (112)
	Gender	-11.62*** (2.14)	-5.42 (111)	-20.48 (19.04)	-1.08 (112)
	Risk	3.55 (2.17)	1.64 (111)	2.58 (19.26)	0.13 (112)

* Note: *** = $p < 0.001$, ** = $p < 0.01$, * = $p < 0.05$, $^{+}$ = $p < 0.08$

Figure 2.1 Association between Social Support Total, Anxiety, and Depression

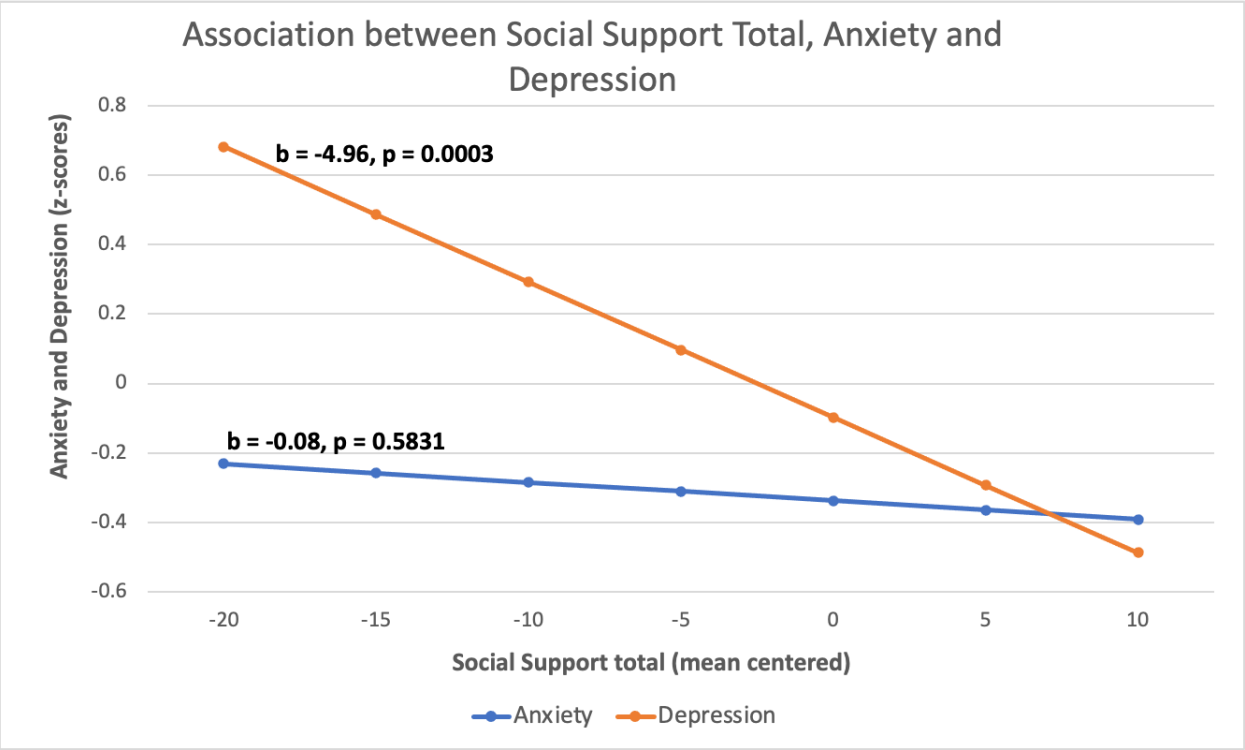

Table 2.6 Impact of gender on associations between social support, mastery, and outcomes

	Anxiety		Depression	
	b(SE)	*t(df)*	*b(SE)*	t(df)
Model 1				
Intercept	22.34* (9.12)	2.45 (111)	493.71*** (85.27)	5.79 (112)
Social Support Total	0.01 (0.18)	0.05 (111)	-3.9* (1.65)	-2.37 (112)
Gender	-1.41 (14.97)	-0.09 (111)	99.85 (139.25)	0.72 (112)
Risk	6.74** (2.37)	2.84 (111)	35.6 (22.09)	1.61 (112)
Social Support Total*Gender	-0.25 (0.3)	-0.84 (111)	-3.01 (2.76)	-1.09 (112)
Model 2				
Intercept	19.83* (9.43)	2.1 (111)	502.21*** (90.55)	5.55 (112)
Social Support Family	0.17 (0.53)	0.32 (111)	-11.89* (5.11)	-2.33 (112)
Gender	-0.17 (13.81)	-0.01 (111)	-68.5 (132.02)	-0.52 (112)
Risk	6.74** (2.4)	2.81 (111)	32.59 (23)	1.42 (112)
Social Support Family*Gender	-0.81 (0.81)	-1 (111)	0.94 (7.71)	0.12 (112)
Model 3				
Intercept	22.83*** (4.41)	5.18 (111)	374.34*** (40.72)	9.19 (112)
Social Support Friends	0 (0.01)	-0.03 (111)	-0.26* (0.12)	-2.15 (112)
Gender	-8.39 (6.82)	-1.23 (111)	53.7 (63.05)	0.85 (112)
Risk	6.73** (2.38)	2.83 (111)	34.27 (21.96)	1.56 (112)
Social Support Friends*Gender	-0.02 (0.02)	-0.86 (111)	-0.4^{+} (0.21)	-1.87 (112)
Model 4				
Intercept	73.33*** (9.53)	7.7 (110)	869.53*** (84.93)	10.24 (111)
Mastery	-2.28*** (0.42)	-5.37 (110)	-25.84*** (3.78)	-6.84 (111)
Gender	-34.56* (14.33)	-2.41 (110)	-211.36 (126.2)	-1.67 (111)
Risk	3.55 (2.15)	1.65 (110)	2.76 (19.15)	0.14 (111)
Mastery*Gender	1.03 (0.64)	1.62 (110)	8.57 (5.6)	1.53 (111)

* Note: *** = p <0.001, ** = p < 0.01, * = p < 0.05, $^{+}$ = p < 0.08

Figure 2.2 Impact of Gender on the Association between Social Support from Friends and Depression

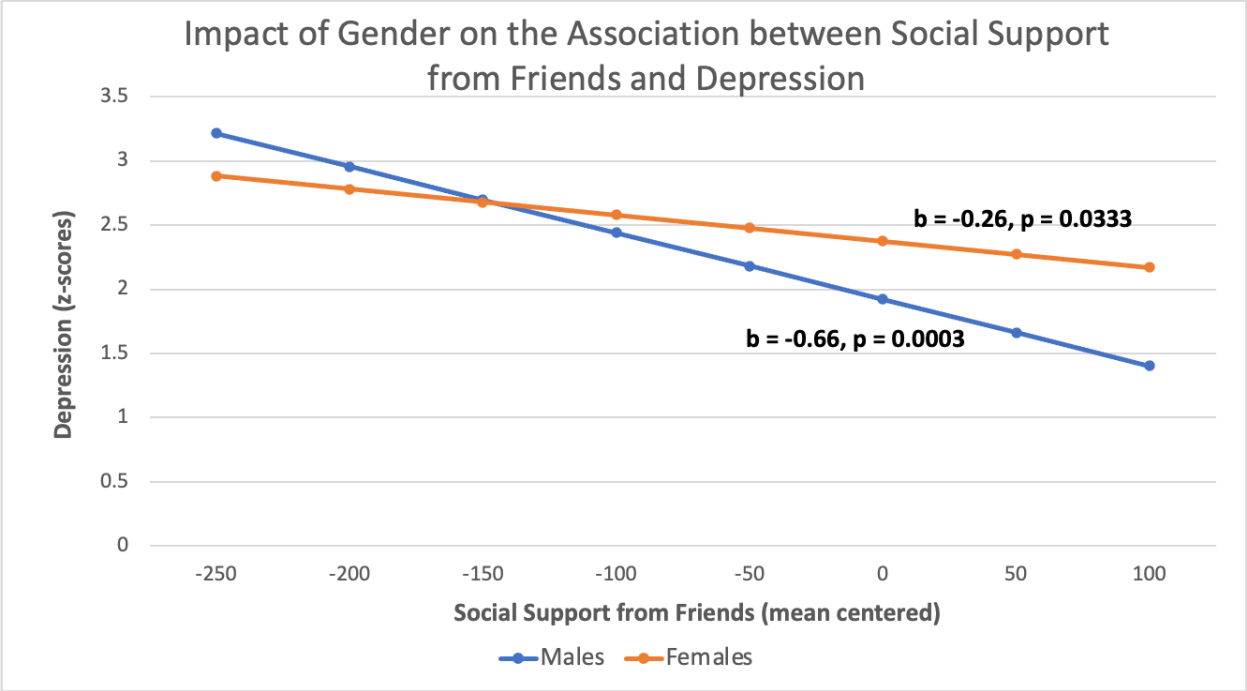

Figure 2.3 Association between Mastery, Anxiety, and Depression

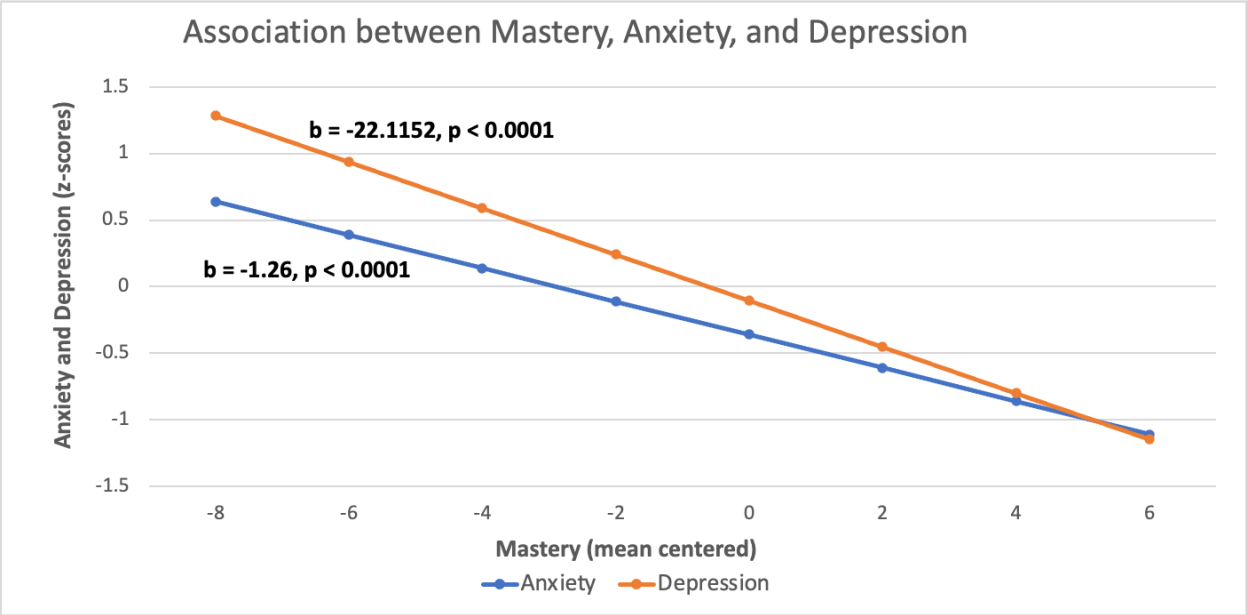

Table 2.7 Association between social support, mastery, and measure of stress exposure

	Subjective Stress		Consensus Stress		Stress sensitivity	
	B(SE)	*T(DF)*	*B(SE)*	*T(DF)*	*B(SE)*	*T(DF)*
Model 1						
Intercept	2.37*** (0.47)	5.09 (113)	15.26*** (3.07)	4.97 (113)	-2.07 (3.31)	-0.62 (113)
Total Social Support	0 (0.01)	-0.18 (113)	-0.11^{+} (0.06)	-1.82 (113)	0.08 (0.06)	1.29 (113)
Risk	0.26^{+} (0.15)	1.78 (113)	3.69*** (0.96)	3.82 (113)	-1.1 (1.04)	-1.06 (113)
Gender	-0.52*** (0.15)	-3.55 (113)	-3.76*** (0.96)	-3.9 (113)	-1.75 (1.04)	-1.69 (113)
Model 2						
Intercept	2.61*** (0.46)	5.69 (113)	12.91*** (3.07)	4.21 (113)	-0.05 (3.29)	-0.01 (113)
Family Social Support	-0.02 (0.03)	-0.74 (113)	-0.17 (0.17)	-1.03 (113)	0.12 (0.18)	0.66 (113)
Risk	0.24 (0.15)	1.63 (113)	3.72*** (0.99)	3.77 (113)	-1.14 (1.06)	-1.08 (113)
Gender	-0.52*** (0.15)	-3.58 (113)	-3.81*** (0.97)	-3.91 (113)	-1.72 (1.05)	-1.64 (113)
Model 3						
Intercept	2.52*** (0.24)	10.55 (113)	13.42*** (1.56)	8.59 (113)	1.22 (1.72)	0.71 (113)
Friend Social Support	0 (0)	-1.17 (113)	-0.01** (0)	-2.68 (113)	0 (0)	0.57 (113)
Risk	0.23 (0.15)	1.61 (113)	3.5*** (0.95)	3.67 (113)	-1.19 (1.05)	-1.14 (113)
Gender	-0.53*** (0.15)	-3.65 (113)	-3.96*** (0.95)	-4.17 (113)	-1.69 (1.05)	-1.61 (113)
Model 4						
Intercept	2.99*** (0.52)	5.69 (112)	14.23*** (3.52)	4.05 (112)	9.08 (3.74)	2.43* (112)
Mastery	-0.03 (0.02)	-1.37 (112)	-0.19 (0.15)	-1.27 (112)	-0.31 (0.16)	-1.93^{+} (112)
Risk	0.22 (0.15)	1.44 (112)	3.66*** (1)	3.64 (112)	-1.82 (1.07)	-1.7 (112)
Gender	-0.49** (0.15)	-3.3 (112)	-3.61*** (0.99)	-3.64 (112)	-1.4 (1.05)	-1.33 (112)

* Note: *** = p <0.001, ** = p < 0.01, * = p < 0.05, $^{+}$ = p < 0.08

Table 2.8 Impact of gender on the association between mastery or social support and subjective stress, consensus stress, and stress sensitivity

	Subjective Stress		Consensus Stress		Stress Sensitivity	
	b(SE)	*t(df)*	*b(SE)*	*t(df)*	*b(SE)*	*t(df)*
Model 1						
Intercept	1.24* (0.53)	2.33 (112)	12.61*** (3.71)	3.4 (112)	-7.94* (3.91)	-2.03 (112)
Social Support Total	0.02* (0.01)	2.05 (112)	-0.05 (0.07)	-0.73 (112)	0.2** (0.08)	2.64 (112)
Risk	0.26^{+} (0.14)	1.9 (112)	3.69*** (0.96)	3.84 (112)	-1.09 (1.01)	-1.07 (112)
Sex	2.69** (0.87)	3.09 (112)	3.82 (6.06)	0.63 (112)	15.05* (6.38)	2.36 (112)
Social Support Total*Gender	-0.06*** (0.02)	-3.73 (112)	-0.15 (0.12)	-1.27 (112)	-0.34** (0.13)	-2.67 (112)
Model 2						
Intercept	1.42* (0.55)	2.56 (112)	5.8 (3.75)	1.55 (112)	-6.28 (4.08)	-1.54 (112)
Social Support Family	0.05 (0.03)	1.67 (112)	0.25 (0.21)	1.17 (112)	0.49* (0.23)	2.12 (112)
Risk	0.25 (0.14)	1.78 (112)	3.78*** (0.95)	3.97 (112)	-1.09 (1.04)	-1.05 (112)
Gender	2.27** (0.81)	2.81 (112)	12.8* (5.47)	2.34 (112)	12.85* (5.95)	2.16 (112)
Social Support Family*Gender	-0.17*** (0.05)	-3.5 (112)	-0.98** (0.32)	-3.08 (112)	-0.86* (0.35)	-2.48 (112)
Model 3						
Intercept	2.18*** (0.26)	8.29 (112)	13.44*** (1.78)	7.57 (112)	-0.28 (1.94)	-0.15 (112)
Social Support Friends	0 (0)	0.54 (112)	-0.01* (0.01)	-2.24 (112)	0.01 (0.01)	1.39 (112)
Risk	0.25 (0.14)	1.75 (112)	3.49*** (0.96)	3.65 (112)	-1.13 (1.04)	-1.08 (112)
Gender	0.54 (0.41)	1.32 (112)	-4.03 (2.75)	-1.47 (112)	2.96 (3)	0.99 (112)
Social Support Friends* Gender	-0.003** (0.00)	-2.8 (112)	0 (0.01)	0.03 (112)	-0.02 (0.01)	-1.65 (112)
Model 4						
Intercept	3.19*** (0.67)	4.79 (111)	17.74*** (4.44)	4 (111)	10.79* (4.75)	2.27 (111)
Mastery	-0.04 (0.03)	-1.37 (111)	-0.36 (0.2)	-1.8 (111)	-0.39^{+} (0.21)	-1.85 (111)
Risk	0.22 (0.15)	1.44 (111)	3.66*** (1)	3.66 (111)	-1.81 (1.07)	-1.7 (111)

Gender	-0.98 (0.99)	-0.99 (111)	-12.02^{+} (6.59)	-1.82 (111)	-5.5 (7.05)	-0.78 (111)
Mastery* Gender	0.02 (0.04)	0.51 (111)	0.38 (0.29)	1.29 (111)	0.18 (0.31)	0.59 (111)

* Note: *** = p <0.001, ** = p < 0.01, * = p < 0.05, $^{+}$ = p < 0.08

Figure 2.4 Impact of Gender on the Association between Social Support Total and Subjective Stress

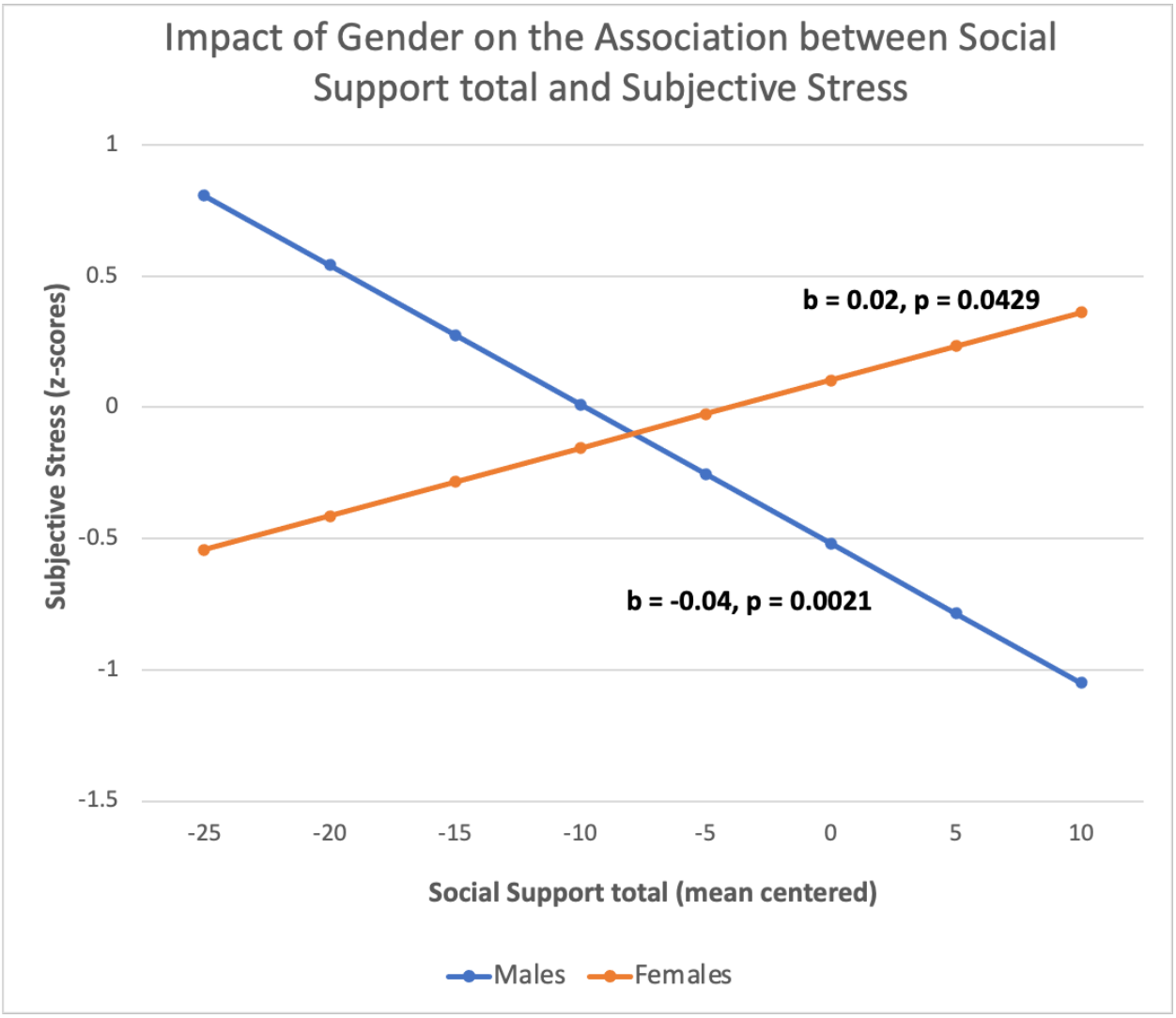

Figure 2.5 Impact of Gender on the Association between Social Support from Family and Consensus Stress

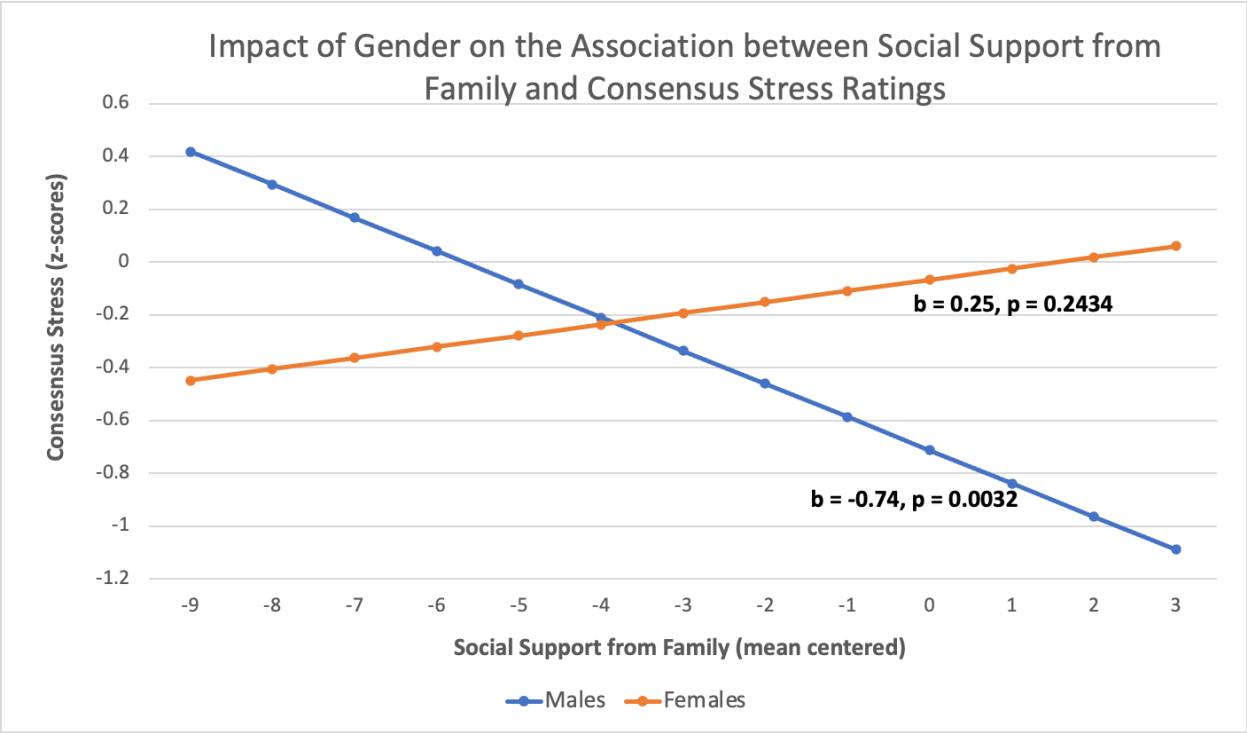

Figure 2.6 Impact of Gender on the Association between Social Support Total and Stress Sensitivity

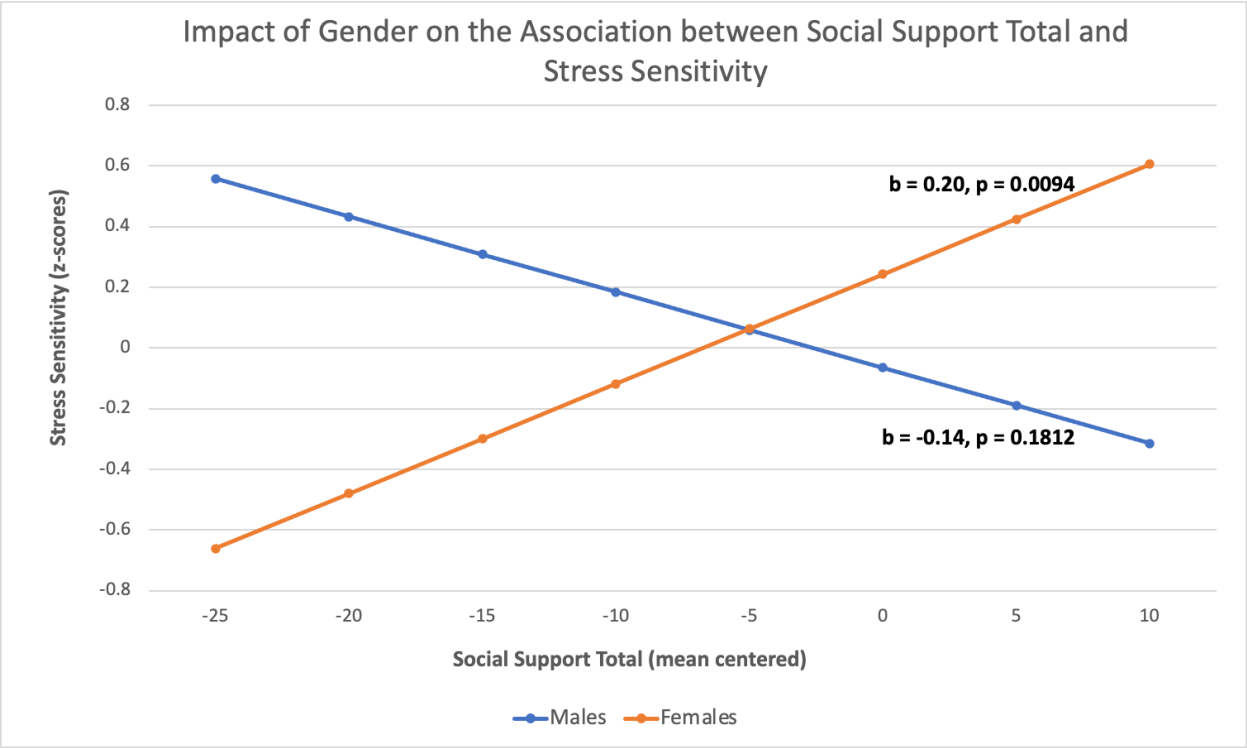

Figure 2.7 Impact of Gender on the Association between Mastery and Stress Sensitivity

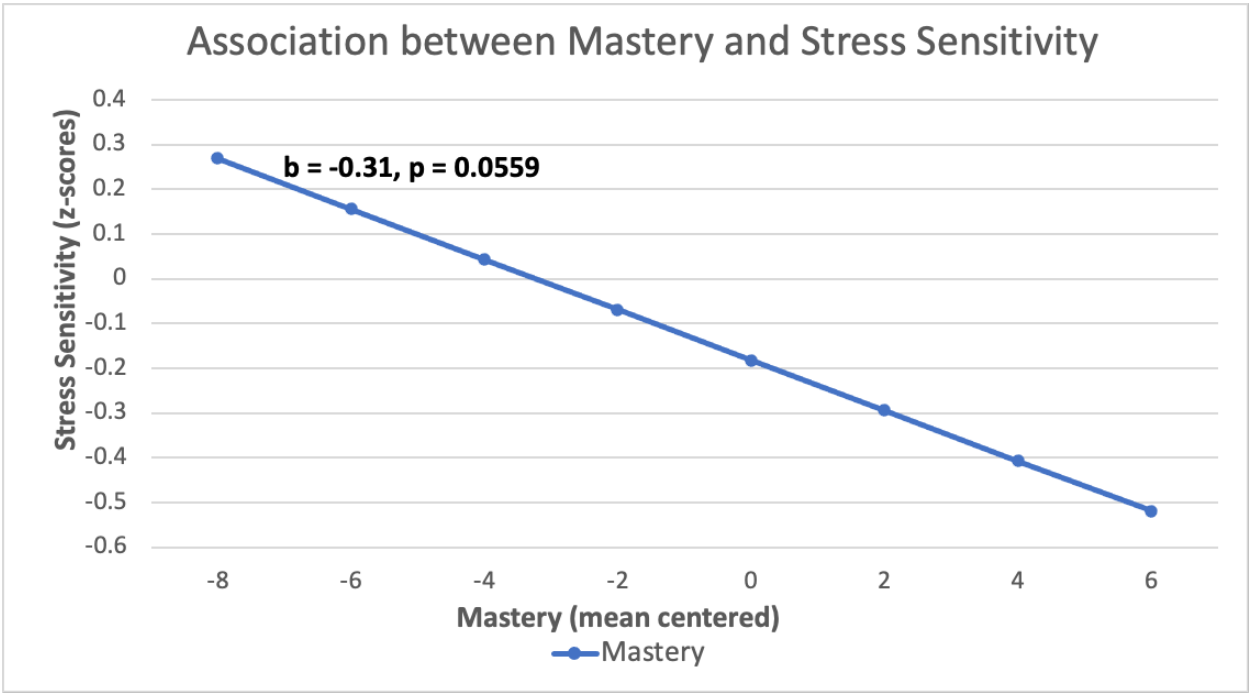

Table 2.9 Association between metrics of stress exposure and outcomes

	Anxiety		Depression		Perceived Stress	
	B(SE)	*T(DF)*	*B(SE)*	*T(DF)*	*B(SE)*	*T(DF)*
Model 1						
Intercept	12.24** (3.88)	3.16 (112)	170.92*** (37.8)	4.52 (113)	11.67*** (2.07)	5.64 (113)
Subjective Stress	4.56** (1.46)	3.12 (112)	53.71*** (14.23)	3.77 (113)	1.93* (0.78)	2.48 (113)
Gender	-11.4*** (2.4)	-4.74 (112)	-23.37 (23.3)	-1 (113)	-3.55** (1.28)	-2.78 (113)
Risk	5.65 * (2.28)	2.48 (112)	33.25 (22.17)	1.5 (113)	1.87 (1.21)	1.54 (113)
Model 2						
Intercept	17.01*** (2.96)	5.74 (112)	220.67*** (28.76)	7.67 (113)	12.95*** (1.55)	8.35 (113)
Consensus Stress	0.57** (0.22)	2.58 (112)	7.39*** (2.14)	3.45 (113)	0.32** (0.12)	2.74 (113)
Gender	-11.64*** (2.45)	-4.75 (112)	-23.26 (23.74)	-0.98 (113)	-3.35* (1.28)	-2.62 (113)
Risk	4.64^{+} (2.44)	1.9 (112)	18.3 (23.61)	0.78 (113)	1.13 (1.27)	0.89 (113)
Model 3						
Intercept	21.3*** (2.02)	10.56 (112)	280.49*** (20.03)	14 (113)	15.63*** (1.09)	14.36 (113)
Stress Sensitivity	0.66** (0.2)	3.25 (112)	6.42** (2.02)	3.19 (113)	0.22* (0.11)	2.02 (113)
Gender	-12.64*** (2.3)	-5.5 (112)	-40.1 (22.74)	-1.76 (113)	-4.16*** (1.23)	-3.37 (113)
Risk	7.73*** (2.26)	3.42 (112)	55.77* (22.36)	2.49 (113)	2.67* (1.21)	2.2 (113)

* Note: *** = $p < 0.001$, ** = $p < 0.01$, * = $p < 0.05$, $^{+}$ = $p < 0.08$

Figure 2.8 Association between Subjective Stress and Symptoms of Anxiety and Depression

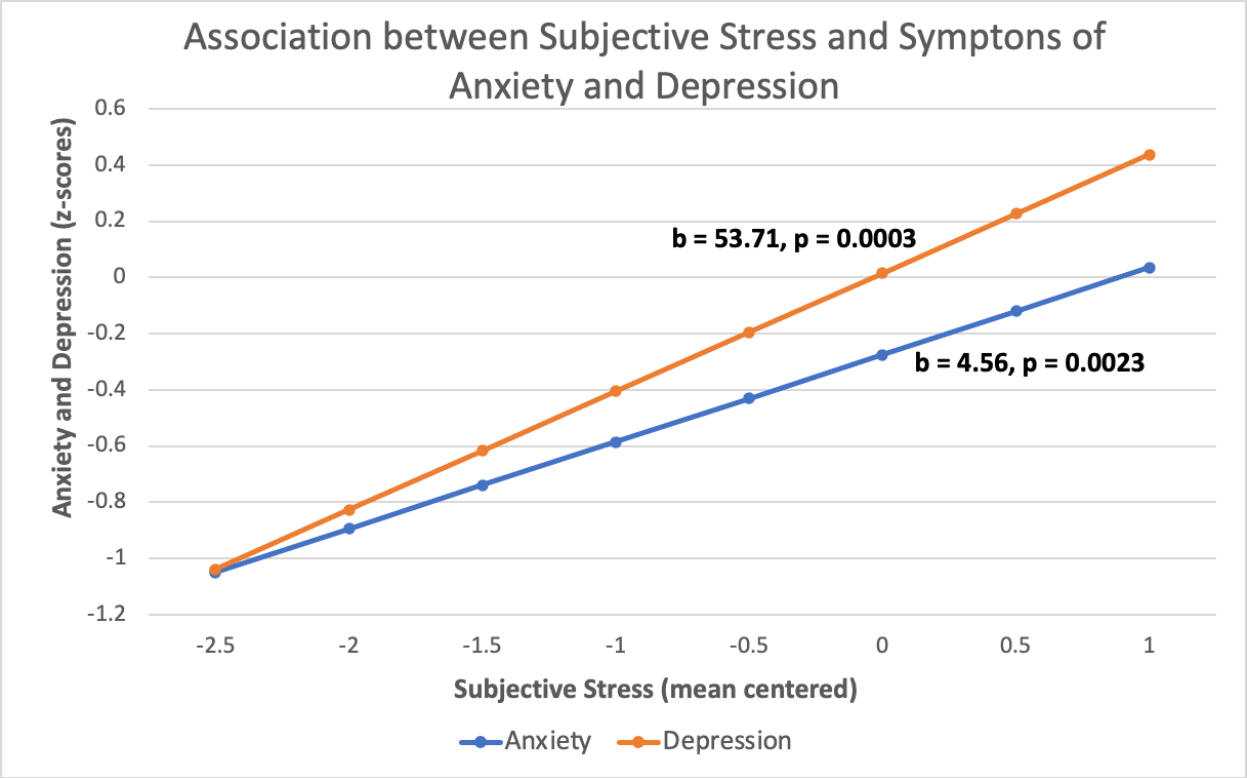

Figure 2.9 Association between Consensus Stress and Symptoms of Anxiety and Depression

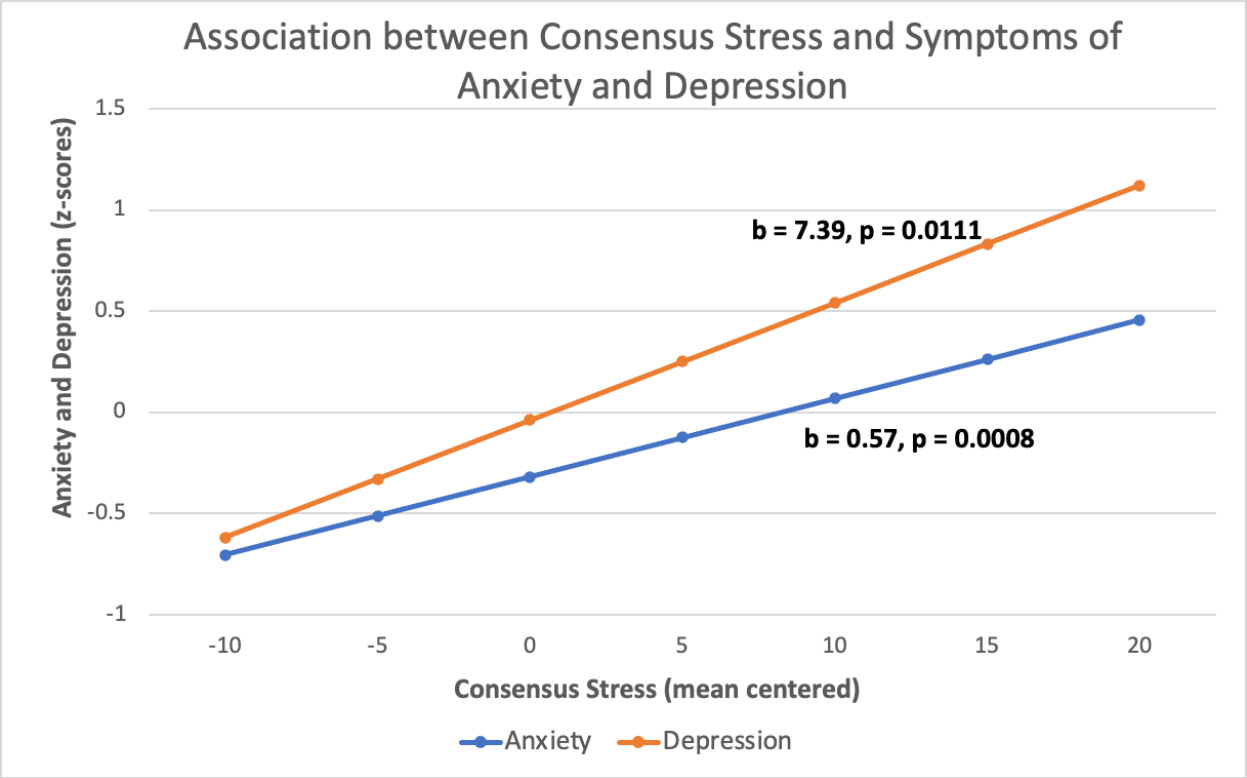

Figure 2.10 Association between Stress Sensitivity and Symptoms of Anxiety and Depression

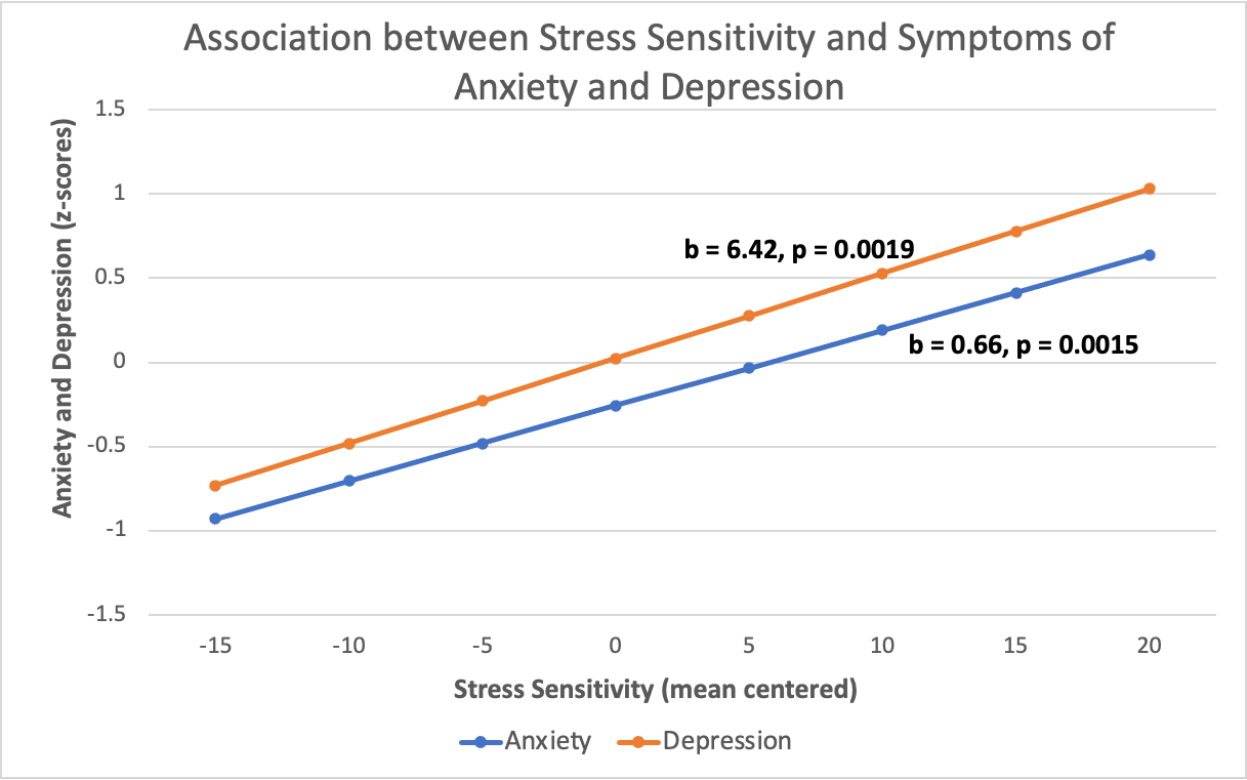

Table 2.10 Association between subjective stress, social support, and the interaction between subjective stress and social support and symptoms of anxiety and depression

	Anxiety		Depression	
	b(SE)	*t(df)*	*b(SE)*	*t(df)*
Model 1a				
Intercept	15.8^{+} (8.06)	1.96 (111)	20.2*** (2.18)	9.28 (112)
Subjective Stress	4.54** (1.47)	3.1 (111)	1.51*** (0.4)	3.8 (112)
Social Support Total	-0.07 (0.14)	-0.5 (111)	-0.13*** (0.04)	-3.63 (112)
Risk	5.5* (2.31)	2.38 (111)	0.47 (0.62)	0.76 (112)
Gender	-11.4*** (2.41)	-4.72 (111)	-0.54 (0.65)	-0.83 (112)
Model 1b				
Intercept	42.09* (17.64)	2.39 (108)	376.73* (164.06)	2.3 (109)
Subjective Stress	-5.12 (6.89)	-0.74 (108)	86.85 (64.12)	1.35 (109)
Social Support Total	-0.79 *(0.38)	-2.08 (108)	-5.08 (3.55)	-1.43 (109)
Risk	4.42^{+} (2.3)	1.92 (108)	14.87 (21.41)	0.69 (109)
Gender	3.43 (17.49)	0.2 (108)	121.74 (160.83)	0.76 (109)
Subjective Stress*Social Support Total	0.28^{+} (0.15)	1.9 (108)	-0.2 (1.36)	-0.15 (109)
Subjective Stress*Gender	-7.84* (3.19)	-2.46 (108)	-54.41 (29.66)$^{+}$	-1.83 (109)
Social Support Total*Gender	0.06 (0.31)	0.21 (108)	-0.6 (2.85)	-0.21 (109)
Model 2a				
Intercept	13.69 (8.16)	1.68 (111)	19.1*** (2.24)	8.52 (112)
Subjective Stress	4.54** (1.47)	3.08 (111)	1.45*** (0.41)	3.57 (112)
Social Support Family	-0.08 (0.39)	-0.2 (111)	-0.32** (0.11)	-2.96 (112)
Risk	5.56* (2.34)	2.38 (111)	0.4 (0.64)	0.62 (112)
Gender	-11.42*** (2.42)	-4.72 (111)	-0.64 (0.66)	-0.97 (112)
Model 2b				
Intercept	30.96 (22.17)	1.4 (108)	467.62* (209.76)	2.23 (109)
Subjective Stress	-2.03 (9)	-0.23 (108)	44.06 (85.14)	0.52 (109)
Social Support Family	-1.45 (1.3)	-1.12 (108)	-19.89 (12.31)	-1.62 (109)
Risk	5.19* (2.4)	2.16 (108)	14.22 (22.7)	0.63 (109)
Gender	9.56 (16.72)	0.57 (108)	-75.37 (156.31)	-0.48 (109)
Subjective Stress*Social Support Family	0.53 (0.51)	1.04 (108)	1.75 (4.83)	0.36 (109)
Subjective Stress*Gender	-6.34* (3.15)	-2.02 (108)	-40.14 (29.64)	-1.35 (109)

Social Support Family*Gender	-0.42 (0.84)	-0.5 (108)	8.35 (7.80)	1.06 (109)
Model 3a				
Intercept	13.23* (5.28)	2.5 (111)	16.12*** (1.46)	11.06 (112)
Subjective Stress	4.51** (1.48)	3.05 (111)	1.4*** (0.41)	3.44 (112)
Social Support Friends	0 (0.01)	-0.28 (111)	-0.01** (0)	-2.89 (112)
Risk	5.56* (2.32)	2.4 (111)	0.5 (0.64)	0.79 (112)
Gender	-11.47*** (2.43)	-4.72 (111)	-0.75 (0.67)	-1.13 (112)
Model 3b				
Intercept	23.97* (9.5)	2.52 (108)	190.71* (89.42)	2.13 (109)
Subjective Stress	0.71 (3.45)	0.21 (108)	81.08* (32.54)	2.49 (109)
Social Support Friends	-0.07* (0.03)	-2.15 (108)	-0.1 (0.32)	-0.31 (109)
Risk	4.11^{+} (2.32)	1.77 (108)	20.49 (21.82)	0.94 (109)
Gender	7.85 (10.34)	0.76 (108)	144.53 (97.2)	1.49 (109)
Subjective Stress*Social Support Friends	0.03* (0.01)	2.2 (108)	-0.07 (0.12)	-0.62 (109)
Subjective Stress*Gender	-8.34* (3.21)	-2.6 (108)	-40.32 (30.22)	-1.33 (109)
Social Support Friends*Gender	0 (0.02)	-0.14 (108)	-0.35 (0.22)	-1.56 (109)

* Note: *** = $p < 0.001$, ** = $p < 0.01$, * = $p < 0.05$, $^{+}$ = $p < 0.08$

Table 2.11 Association between consensus stress, social support, and the interaction between consensus stress and social support and symptoms of anxiety and depression

	Anxiety		Depression	
	b(SE)	*t(df)*	*b(SE)*	*t(df)*
Model 1a				
Intercept	17.99* (8.12)	2.21 (111)	21.07*** (2.22)	9.48 (112)
Consensus Stress	0.57* (0.22)	2.51 (111)	0.18** (0.06)	2.86 (112)
Social Support Total	-0.02 (0.14)	-0.13 (111)	-0.12*** (0.04)	-3.07 (112)
Risk	4.62^{+} (2.46)	1.88 (111)	0.21 (0.67)	0.32 (112)
Gender	-11.6*** (2.47)	-4.72 (111)	-0.66 (0.67)	-0.98 (112)
Model 1b				
Intercept	25.55 (19.55)	1.31 (108)	354.48* (179.76)	1.97 (109)
Consensus Stress	-0.24 (1.29)	-0.18 (108)	10.24 (11.88)	0.86 (109)
Social Support Total	-0.22 (0.39)	-0.57 (108)	-2.97 (3.56)	-0.83 (109)
Risk	4.66^{+} (2.47)	1.89 (108)	11.4 (22.61)	0.5 (109)
Gender	0.87 (19.2)	0.05 (108)	245.94 (175.89)	1.4 (109)
Consensus Stress*Social Support Total	0.02 (0.03)	0.78 (108)	-0.03 (0.24)	-0.12 (109)
Consensus Stress*Gender	-0.58 (0.46)	-1.27 (108)	-8.65* (4.24)	-2.04 (109)
Social Support Total*Gender	-0.14 (0.35)	-0.39 (108)	-3.89 (3.24)	-1.2 (109)
Model 2a				
Intercept	18.31* (7.82)	2.34 (111)	20.41*** (2.15)	9.48 (112)
Consensus Stress	0.57* (0.22)	2.54 (111)	0.19** (0.06)	3.12 (112)
Social Support Family	-0.07 (0.4)	-0.18 (111)	-0.31** (0.11)	-2.86 (112)
Risk	4.57^{+} (2.48)	1.84 (111)	0.04 (0.68)	0.05 (112)
Gender	-11.67*** (2.47)	-4.73 (111)	-0.67 (0.68)	-0.98 (112)
Model 2b				
Intercept	25.78 (15.52)	1.66 (108)	515.67*** (143.91)	3.58 (109)
Consensus Stress	-0.17 (1.07)	-0.16 (108)	3.33 (9.93)	0.33 (109)
Social Support Family	-0.64 (0.9)	-0.71 (108)	-18.96* (8.35)	-2.27 (109)
Risk	4.79^{+} (2.54)	1.89 (108)	3.71 (23.47)	0.16 (109)
Gender	3.79 (16.76)	0.23 (108)	-7.38 (154.93)	-0.05 (109)
Consensus Stress*Social Support Family	0.05 (0.06)	0.89 (108)	0.4 (0.56)	0.71 (109)
Consensus Stress*Gender	-0.55 (0.51)	-1.08 (108)	-8.13 (4.74)	-1.71 (109)
Social Support Family*	-0.59 (0.88)	-0.68 (108)	3.63 (8.07)	0.45 (109)

Gender				
Model 3a				
Intercept	16.95*** (4.88)	3.47 (111)	17.38*** (1.36)	12.81 (112)
Consensus Stress	0.57* (0.23)	2.5 (111)	0.17** (0.06)	2.68 (112)
Social Support Friends	0 (0.01)	0.02 (111)	-0.01* (0)	-2.47 (112)
Risk	4.64^{+} (2.46)	1.89 (111)	0.24 (0.68)	0.35 (112)
Gender	-11.64*** (2.49)	-4.67 (111)	-0.82 (0.69)	-1.19 (112)
Model 3b				
Intercept	22.89* (10.18)	2.25 (108)	255.26** (93.91)	2.72 (109)
Consensus Stress	0.08 (0.6)	0.14 (108)	8.36 (5.49)	1.52 (109)
Social Support Friends	-0.03 (0.03)	-0.96 (108)	-0.16 (0.3)	-0.52 (109)
Risk	4.24 (2.46)	1.73 (108)	12.77^{+} (22.59)	0.57 (109)
Gender	-2.77 (9.68)	-0.29 (108)	175.59 (89.32)	1.97 (109)
Consensus Stress*Social Support Friends	0 (0)	1.37 (108)	0 (0.02)	0.02 (109)
Consensus Stress*Gender	-0.73 (0.45)	-1.6 (108)	-7.56^{+} (4.19)	-1.81 (109)
Social Support Friends*Gender	-0.01 (0.03)	-0.29 (108)	-0.5^{+} (0.26)	-1.96 (109)

* Note: *** = $p < 0.001$, ** = $p < 0.01$, * = $p < 0.05$, $^{+}$ = $p < 0.08$

Table 2.12 Association between subjective stress, mastery, and the interaction between subjective stress and mastery and outcomes

	Anxiety		Depression	
	b(SE)	*t(df)*	*b(SE)*	*t(df)*
Model 1a				
Intercept	52.87*** (8.44)	6.27 (110)	27.85*** (2.12)	13.16 (111)
Subjective Stress	3.66** (1.33)	2.75 (110)	1.27*** (0.34)	3.8 (111)
Mastery	-1.72*** (0.32)	-5.32 (110)	-0.62*** (0.08)	-7.69 (111)
Risk	2.75 (2.13)	1.29 (110)	0.17 (0.55)	0.31 (111)
Gender	-9.81*** (2.19)	-4.49 (110)	-0.4 (0.54)	-0.75 (111)
Model 1b				
Intercept	54.09* (23.79)	2.27 (107)	539.69* (205.9)	2.62 (108)
Subjective Stress	6.14 (9.06)	0.68 (107)	121.43 (78.41)	1.55 (108)
Mastery	-1.99^{+} (1.11)	-1.8 (107)	-15.58 (9.57)	-1.63 (108)
Risk	2.36 (2.12)	1.11 (107)	-6.79 (18.43)	-0.37 (108)
Gender	-18.13 (16.23)	-1.12 (107)	-116.98 (138.93)	-0.84 (108)
Subjective Stress*Mastery	-0.02 (0.44)	-0.06 (107)	-3.5 (3.77)	-0.93 (108)
Subjective Stress*Gender	-4.28 (2.85)	-1.5 (107)	-2.34 (24.71)	-0.09 (108)
Mastery*Gender	0.78 (0.66)	1.18 (107)	5.52 (5.64)	0.98 (108)

* Note: *** = $p < 0.001$, ** = $p < 0.01$, * = $p < 0.05$, $^{+}$ = $p < 0.08$

Table 2.13 Association between consensus stress, mastery, and the interaction between consensus stress and mastery and outcomes

	Anxiety		Depression	
	b(SE)	*t(df)*	*b(SE)*	*t(df)*
Model 1a				
Intercept	57.49*** (8.02)	7.17 (110)	29.16*** (2.02)	14.47 (111)
Consensus Stress	0.45** (0.2)	2.26 (110)	0.18*** (0.05)	3.47 (111)
Mastery	-1.75*** (0.33)	-5.38 (110)	-0.63*** (0.08)	-7.7 (111)
Risk	1.89 (2.25)	0.84 (110)	-0.77 (0.57)	-1.35 (111)
Gender	-9.98*** (2.23)	-4.48 (110)	0.18 (0.56)	0.33 (111)
Model 1b				
Intercept	50.47 (21.47)	2.35 (107)	550.49** (183.52)	3 (108)
Consensus Stress	1.62 (1.57)	1.03 (107)	22.47 (13.43)	1.67 (108)
Mastery	-1.48 (0.95)	-1.56 (107)	-14.84^{+} (8.11)	-1.83 (108)
Risk	1.98 (2.26)	0.88 (107)	-20.04 (19.27)	-1.04 (108)
Gender	-20.93 (16.83)	-1.24 (107)	-20.63 (143.12)	-0.14 (108)
Consensus Stress*Mastery	-0.05 (0.07)	-0.71 (107)	-0.69 (0.61)	-1.13 (108)
Consensus Stress*Risk	-0.21 (0.4)	-0.53 (107)	-2.83 (3.46)	-0.82 (108)
Consensus Stress*Gender	0.58 (0.71)	0.82 (107)	2.28 (6.04)	0.38 (108)

* Note: *** = p <0.001, ** = p < 0.01, * = p < 0.05, $^{+}$ = p < 0.08

Chapter 3 Impact of Participating in the Kids' Empowerment Program on Prosocial Behaviors, Coping Skills, Parent-child Relationship Quality and Symptoms of Anxiety and Depression in School-age Children

The experience of negative life events among young children is common, with one study showing that 80% of children about to enter preschool reported at least one negative life event and the majority reported at least two events (Furniss, Beyer, & Müller, 2009). In a study of Head Start preschoolers, 78% were exposed to violence at home or in their community and 47% were exposed to more than one form of violence. Exposure was the highest predictor of physical health problems for the child (Graham-Bermann & Seng, 2005). Exposure to negative life events may be particularly detrimental for health as young children have a limited ability to cope with stressful experiences (Altshuler & Ruble, 1989; Kerker et al., 2015). Social support from trusted adults may increase a child's ability to cope with adversity (Bean, Pingel, Hallqvist, Berg, & Hammarström, 2019; Chu, Saucier, & Hafner, 2010). In addition, group based intervention programs have been shown to influence emotion regulation and social skills (Graham-Bermann, Miller-Graff, Howell, & Grogan-Kaylor, 2015; Kraag, Zeegers, Kok, Hosman, & Abu-Saad, 2006). While these interventions have been shown to promote wellbeing, it remains unclear whether changes in emotion regulation and social skills may provide a mechanism by which interventions impact well-being. The second study of my dissertation investigates the effectiveness of the Kids Empowerment Program (Graham-Bermann, 2018) a novel skills-based group intervention, at influencing prosocial behaviors, emotion regulation, parent-child-relationship quality, and symptoms of anxiety and depression in children. We hypothesize that

greater use of prosocial behaviors and greater emotional regulation skills, will mediate the impact of this intervention on children's parent-child relationship closeness and internalizing symptoms. This study also investigates the moderating role of stress exposure on the relationships between the intervention, emotion regulation skills, and prosocial behaviors. We hypothesize the greater levels of stress exposure will be associated with fewer emotion regulation and prosocial behaviors at time 1 and stress exposure will moderate the impact of the intervention on changes in prosocial behaviors and emotion regulation skills.

Stress Exposure in Childhood

Adverse experiences in childhood account for 44% of childhood onset mental health conditions and 20% of adult onset mental health disorders (Kessler et al., 2010). Extensive research has focused on the experience of childhood adversity and its effect on well-being across the lifespan (Kalmakis & Chandler, 2015; Oh et al., 2018 for recent reviews and meta-analyses; see Stoltenborgh, Bakermans-Kranenburg, Alink, & van IJzendoorn, 2015). The experience of maltreatment and neglect in childhood has been associated with increased physical and psychological conditions, risk behaviors, and developmental disruptions (Kalmakis & Chandler, 2015). Greater exposure to negative life events in childhood has been associated with risk for anxiety and depression in school-aged children (Platt, Williams, & Ginsburg, 2016; Willard, Long, & Phipps, 2016). Stress exposure in childhood has also been associated with heightened emotional reactivity to daily events (Chan, Poon, & Hang Tang, 2016; Glaser, van Os, Portegijs, & Myin-Germeys, 2006; Heim, Newport, Bonsall, Miller, & Nemeroff, 2001), further increasing risk for negative outcomes. Therefore, stress exposure in childhood has significant impacts on childhood well-being, highlighting the need for a better understanding of factors that may promote resilience among stress-exposed children.

Factors Associated with Resilience in Childhood

Although adverse experiences in childhood are common, not all children who experience negative life events exhibit negative mental health outcomes. Therefore, resilience is possible. Resilience has been defined as the ability to succeed, resist, cope with, or 'bounce back' from adversity (Kalisch et al., 2017). Resilience in this context reflects the extent to which an individual's coping skills buffer against stress (Gaffey, Bergeman, Clark, & Wirth, 2016). Coping skills refer to cognitive, emotional, and behavioral efforts people use to tolerate, escape, or minimize the effects of stress (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001; Folkman, 1984; Lazarus & Folkman, 1984). For instance, children may cope with stressful experiences by seeking out social support or they may attempt to modulate their emotional reactions to stressful experiences by relying on emotion regulation skills. Greater use of social support (Chu et al., 2010) and a greater repertoire of emotion regulation skills (Compas et al., 2017) have been associated with resilience in stress-exposed children.

Social Support. Children who report greater levels of social support demonstrate a fewer negative outcomes in the face of adversity compared to children who report lower social support (see Chu et al., 2010 for a meta-analysis). Social support refers to psychological and material resources provided by others to help the individual cope with stress (Cohen, 2004). Social support in children may include offering distraction from a distressing event, validating the child's emotions and experience, helping to resolve the situation, and assisting in problem solving or providing the resources needed address the stressful situation. The experience of greater social support promotes feelings of self-worth, purpose, and positive affect in children (Cohen, 2004; Rueger, Malecki, Pyun, Aycock, & Coyle, 2016). In the context of increased stress exposure, greater perceived social support has been associated with reduced anxiety and

depressive symptoms in school-aged children and adolescents (Kennedy, Bybee, Sullivan, & Greeson, 2010; Rueger et al., 2016).

Children receive social support from friends, parents, and other trusted adults. For school-aged children, social support from adults may be more important for well-being than support from peers (Chu et al., 2010). In this developmental stage, children rely on adults to model stress coping and emotion regulation skills (Bridgett, Burt, Edwards, & Deater-Deckard, 2015; Edwards, Rapee, & Kennedy, 2010) and foster healthy development (Rueger et al., 2016). Positive, stable relationships with parents has been associated with better social adjustment in school aged children (Elicker, England, & Sroufe, 2015). Children appear to feel more empowered to engage with negative life events when they have a confident bond with a supportive adult (Wagner, Cohen, & Brook, 1996). Therefore, a positive, close relationship with a parent may impact the child's perception and responses to stressful life events and promote resilience.

During middle childhood, children's social networks become more elaborate and significantly more important (Masten & Coatsworth, 1998). Interactions with socially-rewarding peers and activities in childhood fosters the development of social values and feelings of connectedness (Over, 2016). Children who engage in greater prosocial behaviors, defined as voluntary actions intended to benefit others, tend to display greater social competence with peers, good social skills, better conflict resolution, and optimal emotional regulation (Alvord & Grados, 2005; Fabes & Eisenberg, 1998; Imuta, Henry, Slaughter, Selcuk, & Ruffman, 2016). Maltreated children appear to exhibit fewer prosocial behaviors and have been found to be more disliked and viewed as aggressive and withdrawn by their peers (Anthonysamy & Zimmer-Gembeck, 2007). Interventions that promote the development and use of prosocial behaviors

appear to increase feelings of perceived social support and promote well-being among school aged children (Muratori et al., 2015). Therefore, increasing prosocial behaviors may improve children's relationships with peers and supportive adults, thereby increasing perceived social support and promoting resilience.

Emotion Regulation. Children's use of emotion regulation skills has also been associated with resilience (Compas et al., 2017). Thompson and colleagues (Thompson, 2008) define emotion regulation as, "the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals" (pp 27-28). Children who engage in greater use of rumination, avoidance, or suppression of emotions display greater symptoms of anxiety and depression (Aldao & Nolen-Hoeksema, 2010; Aldao, Nolen-Hoeksema, & Schweizer, 2010; Compas et al., 2017). Children who demonstrate poorer emotion regulation and exhibit aggression and lack of control in social situations are more likely to experience social isolation, peer rejection, and externalizing psychopathology rejection by peers (Calkins, Gill, Johnson, & Smith, 2001; Kim & Cicchetti, 2010). Further, poor emotional regulation skills may impact children's ability to learn and succeed in school, negatively affecting their academic achievement (Graziano, Reavis, Keane, & Calkins, 2007; Gumora & Arsenio, 2002). Maltreated children have been shown to exhibit greater difficulties regulating affective experiences compared to children who have not experience such adversity (Cicchetti, Ganiban, & Barnett, 1991), highlighting the importance of considering trauma exposure when assessing emotional regulation abilities.

A recent meta-analysis concluded that emotion regulation is most effective when a child has a greater repertoire of skills that can be used flexibly in response to different emotions and stressors (Compas et al., 2017). Children displaying high emotion regulation skills can respond

to social demands with a range of acceptable and flexible behaviors (Cole, Michel, & Teti, 1994). Children who can more effectively utilize cognitive emotion regulation skills may be more planful and consider alternative coping strategies (Compas et al., 2017). Among maltreated children, greater emotion regulation skills has been linked with greater peer acceptance and reduced internalizing symptomatology over time (Kim & Cicchetti, 2010). Effective emotion regulation skills appear to play a critical role in childhood emotional well-being, cognitive developmental, and academic achievement (Djambazova-Popordanoska, 2016). Therefore, a greater repertoire of emotion regulation skills and use of adaptive emotion regulation skills may be promotive of resilience.

Interventions Promoting Resilience

A number of universal prevention group programs have been implemented in school settings, including the Coping Power Program (Muratori et al., 2015), the EMOTION program (Martinsen et al., 2019), school-based mindfulness training (Mostafazadeh, Ebadi, Mousavi, & Nouroozi, 2019), and school-based cognitive-behavioral depression prevention program (Garmy, Clausson, Berg, Steen Carlsson, & Jakobsson, 2019). Interventions disseminated in schools have shown to improve children's stress management, coping skills, and relationships with peers, and reduce internalizing symptoms (Kraag et al., 2006; Muratori et al., 2015; Taylor, Oberle, Durlak, & Weissberg, 2017). However, these interventions vary in effectiveness. For example, narrow interventions that only address social skills were found to be less effective for stress reduction than interventions that included broader training focused on social skills, psychoeducation, coping skills, and relaxation training (Kraag et al., 2006). Additionally, interventions targeting childhood and early adolescence may be more effective than interventions in late adolescence as older teens may be more resistant to change and already suffering from

symptoms of internalizing psychopathology, which has been shown to be associated with maladaptive stress coping (Compas et al., 2017).

One promising intervention is the Kids Empowerment Program (KEP), developed by Dr. Sandra Graham-Bermann. The KEP aims to promote well-being among school aged-children through weekly group sessions teaching skills associated with resilience (Graham-Bermann, 2018). Session topics include identifying and managing emotions, successful problem-solving, stress reduction, identifying and using personal character strengths, positive relationships, resilient coping, and building confidence in one's skills and abilities. This program is an extension of the Kids Club Program, which has been shown to increase well-being among children exposed to intimate partner violence (Graham-Bermann, 2011; Graham-Bermann, Howell, Lilly, & Devoe, 2011; Graham-Bermann et al., 2015; Graham-Bermann & Miller-Graff, 2015; Howell, Miller, Lilly, & Graham-Bermann, 2013), and adapts some procedures of the successful Mood Lifters^{TM} program for adults (Votta, Belpedio, Roberts, Porte, & Deldin, n.d.). KEP aims to foster resilience among children exposed to all types of stress by promoting the development of coping and social skills, among other behaviors. While preliminary evidence suggests that participation in KEP was associated with reductions in symptoms of anxiety compared to controls (Graham-Bermann, Roberts, Osbourne, Shaughnessy, & Finkelstein, n.d.), the mechanisms by which this program impacts mental health remain unknown. Given the focus on social skills, emotion regulation, and coping, it is possible that participation in this program increases children's perceptions of social support and their use of emotion regulation skills and problem-focused coping relative to comparison children who do not participate in the program. Further research is needed to determine whether participation in this program increased prosocial behaviors, emotion regulation, and the use of coping skills, and whether greater prosocial

behaviors, emotion regulation, and coping are associated with more positive adult-child relationships and internalizing symptoms. Additionally, previous literature on the dose-response effect of psychotherapy suggests that individuals who spend more time attending therapy show greater improvements, however the degree of improvement depends on the symptomatology of the patient (Harnett, O'Donovan, & Lambert, 2010; Robinson, Delgadillo, & Kellett, 2020). Previous research from our lab suggests that the number of sessions the child attended was significantly associated with greater reductions in symptoms of anxiety and depression (Graham-Bermann et al., n.d.). However, it remains to be determined whether treatment dosage (i.e. the number of sessions attended) impacted the degree to which parent-child relationships, prosocial behaviors and emotion regulation skills changed as a result of participating in KEP. Finally, the moderating role of exposure to negative life events should be considered in order to assess whether changes in prosocial behaviors, emotion regulation, and coping skills influence the likelihood of resilience in the face of adversity.

Aims & Hypotheses

Study two of this dissertation seeks to examine whether participation in KEP impacted prosocial behaviors, emotion regulation, coping skills, parent-child relationships and symptoms of anxiety and depression in school aged children, compared to treatment-seeking children who did not participate in the program. Further, this study investigated whether improvements in factors related to resilience provides a mechanism by which the KEP intervention influenced parent-child relationship quality and symptoms of anxiety and depression. Finally, this study assessed the impact of negative life events in childhood on the relationship between resilience factors (e.g. prosocial behaviors, emotion regulation, and coping skills) and parent-child

relationship quality and symptoms of anxiety and depression. The specific aims of this study are to:

1. Assess whether participation in the KEP intervention impacted parent and child reported symptoms of anxiety and depression and parent reported parent-child relationship quality when compared to a waitlist control group.
2. Assess whether participation in the KEP intervention impacted self-reported use of emotion regulation skills and parent-reported use of prosocial behaviors and emotion regulation skills when compared to a waitlist control group.
3. Examine whether changes in prosocial behaviors and emotion regulation skills provide a mechanism by which the KEP intervention influenced internalizing symptoms and parent-child relationship quality.
4. Investigate the impact of stress exposure on initial levels of prosocial behaviors and emotion regulation skills and determine whether stress exposure moderated the relationship between the intervention and changes in prosocial behaviors and emotion regulation skills.

Method

Participants

Participants were 200 children ages 6-12 years (mean = 8.97 years, SD = 1.51; 50.5% female). Parent questionnaires were also completed by 92 of the participants' parents. See Table 3.1 for the demographic information for the entire sample. Children were semi-randomized into either the experimental (n =118, 54% female) or waitlist control (n = 82, 45% female) conditions. Parents of 92 children (54 experimental; 38 waitlist control group) completed the parent questionnaire (see procedures for explanation low parent yield). There were no significant

differences in age, sex, parent financial situation or parent educational attainment between the experimental and waitlist control groups.

Procedures

This study was approved by the University of Michigan Institutional Review Board and completed across two different settings, one based in schools and another based in the community. Recruitment procedures and eligibility criteria differed based on whether the children were participating in the intervention through the school (n = 64) or in the community (n = 54). Please see Figure 3.1 and Figure 3.2 for the consort diagrams for the school and community programs. For all study sites, children in the active intervention groups completed self-report interviews before and after their participation in the program. Children in the waitlist control group completed these interviews 12 weeks apart prior to their participation in the program. Parents were also invited to complete online questionnaires before and after their child's participation in the program (intervention group) or 12 weeks apart prior to their child's participation in the program (waitlist control group). The parent questionnaire was added to the study after the initial 4 school groups had been completed and participation in this questionnaire was not required in order for the child to participate in the study. Therefore, the completion rate of parent questionnaires is significantly lower than for the child interviews. Data were also collected at the first and last KEP program sessions, including an ongoing tally of actions/behaviors taken each week, as well as attendance at sessions (see measures).

For the school program, 2 different elementary schools were contacted and chose to participate. A faculty member at the University of Michigan facilitated the introduction between the researchers and the principal of school number 1. Since this was a charter school, permission

from the board of education was not required. The principal approved the study and put the researchers in contact with 7 teachers of grades 3-6th to ask if they would be willing to participate in the program. 1 teacher of 6th graders declined due to concerns that the program would not be developmentally appropriate for this older age group. The current study includes data from all 6 of these classrooms.

For school number 2, a parent whose child participated in one of the community groups suggested the program to the parent teacher organization at her child's school. The researchers were invited to present the project to the principal of school number 2, the parent, and the school social skills coordinator. The researchers completed a series of questions regarding the educational value of the program and submitted the responses, along with the study measures, procedures, and consent forms to the Ann Arbor Board of Education. The Ann Arbor Board of Education approved the program and study for school number 2. The principal identified 5 1st and 3rd grade classrooms to start the program in the fall and winter of 2020. The current study includes participants from 2 classrooms because the groups for 3 classrooms were terminated midway through due to the coronavirus pandemic.

For both schools, each classroom was randomly selected to be active intervention or waitlist control. The 8 teachers who had agreed to offer the program in their classrooms sent home packets containing a letter to the parents explaining the study and program to a total of 150 students. The 4 teachers whose classrooms were selected to be waitlist control sent home the letters the semester before their participation in the program. The 4 teachers whose classrooms were selected to be active intervention sent home those letters at the beginning of the semester, with the program scheduled to begin a few weeks later. The letter explained that the program would be offered in their child's classroom as part of their daily curriculum and that researchers

of the University of Michigan were evaluating the effectiveness of the program. Although all children would participate in the program as part of the agreement with the schools, parents could consent for their child to participate in the research aspect of the program and complete an interview before and after their participation (or twelve weeks apart in they were in the waitlist control condition). Parents were also invited to complete online questionnaires, however parents who were not interested could opt out of the parent questionnaire and their child could still participate in the research interviews. On the consent forms, parents interested in completing the questionnaire provided email addresses in order to receive the online questionnaire link via email. Parents were mailed $15 VISA gift cards for completing the questionnaires at each timepoint. Children who did not receive permission from their parents to participate in the research interviews still received the program as a part of their school curriculum. While all children who received parental consent were invited to participate in the interviews, children demonstrating significant cognitive or developmental delays that interfered with their ability to complete their interview at time 1 were not interviewed at time 2 and dropped from the study (n= 2).

A total of 121 interested parents completed the included consent forms and send them in a sealed envelope with their children to the school. The research team picked up the completed consent forms from the school. After receiving parental consent, a member of the research team met with each child privately, usually in the hallway of the school or an empty classroom or office. The research team member reviewed an assent form with the child to obtain their assent before participating in the in-person interview. One child declined to participate in the interviews during the assent phase and was dropped from the study. Teachers who offered this program in their classrooms were compensated with a $200 VISA gift card to be used to buy classroom

supplies. Parents or children were allowed to withdraw from the study at any time, or drop out of the program, with no negative consequences to them. The parent of one child chose to withdraw her child from the study midway, 1 child moved out of the country, and 3 children were not available for time 2 interviews. Out of the initial 121 children whose parents provided consent for them to participate in the study, 115 (60 intervention, 55 waitlist) participated in the intervention or waitlist control groups and completed interviews at both time 1 an time 2.

The parent questionnaire was introduced as an optional add on component to the study after the first 4 groups had already been completed, so the first 76 participants did not have this option (47 intervention, 29 waitlist). Parents indicated on the consent form whether they would be willing to complete a brief, online questionnaire about their child's thoughts feelings and behaviors. Parents would complete this questionnaire before and after their child's participation in the study (12 weeks apart for the waitlist control group). Of the 45 parents provided the option to complete these questionnaires, 27 consented to participate (12 intervention, 15 waitlist). 1 parent did not respond to requests to complete the time 2 interviews. In the end, a total of 26 parents (12 intervention, 14 waitlist) completed both the time 1 and time 2 parent questionnaires.

Recruitment for the community program was facilitated through flyers posted on Facebook and in community settings frequented by this age group and their parents, such as coffee shops, libraries, and restaurants. Community groups were offered at The University of Michigan Department of Psychology (East Hall) and at the Dexter Wellness Center through a partnership with the 5 Healthy Towns Foundation. Participants contacted the study team via email or phone to express their interest in the program. Parents completed a screener to determine their child's eligibility for the program. Children were excluded from participating in the community groups if they were younger than 6 and older than 12 and had significant

developmental or cognitive delays that might interfere with their ability to work with other children in a group setting or comprehend the program material (n=2). Additionally, children were only enrolled in the community program if their parents provided consent to their participation in the research interviews and the child was able to attend at least 10 of the 12 KEP sessions. Of the 127 families who expressed interest in the program, 2 were excluded due to developmental or cognitive delays, 6 declined to participate, and 40 were lost to follow-up.

In this non-randomized waitlist control study, interested participants were enrolled in the intervention groups until the groups were full (approximately 20-40 children depending on the number of groups offered). Participants who expressed interest in the study after the initial groups were full were invited to join the waitlist group. Participants who join the waitlist group were guaranteed a spot in the groups the following semester. Children and parents in the experimental community group completed in-person interviews before and after their participation in the program. Children and parents in the waitlist group completed interviews and questionnaires 12 weeks apart prior to their enrollment in the program. As compensation for their participation in the interviews, children were allowed to choose a toy worth about $10 from the prize box after the time 1 interview and a toy worth about $15 after the time 2 interview. Parents who consented to the online questionnaire completed this questionnaire before and after their child's participation in the program, either in the office at the time of their child's interview or at home. Parents and children were allowed to withdraw from the study at any time, or drop out of the program, with no negative consequences to them. If children's behavior during the groups became disruptive to the other children's learning or significantly interfered with the group process, their parents were notified and an action plan put into place. If their behavior continued to interfere with the other children's experience and they did not respond to redirection, the child

was asked to leave the group. However, they were still invited to complete terminations interviews. Among all the groups, only one child was asked not to continue due to his disruptive and aggressive behaviors. In sum, 67 children participated in the community groups, with 43 in the experimental group and 24 in the waitlist control group. A total of 65 parents complete the parent questionnaire at time 1 and time 2 (44 intervention, 21 waitlist).

Kids' Empowerment Program

The Kids' Empowerment Program (KEP; Graham-Bermann, 2018) provides support and information over 12 weeks while teaching children self-management skills based on techniques derived from evidence-based practices. The program strengthens cognition (how to think about things), behavior (changing or planning actions), emotions (identifying and expressing feelings), social relationships (peers, parents, siblings), and physical health (de-stressing, exercise). Trained coaches (graduate or undergraduate students) lead each session and follow a treatment manual that describes the research evidence to support the treatment approach. The KEP employs 12 modules designed to enhance well-being and reduce mental health problems. For example, sessions focus on changing negative thoughts that impede optimal functioning using Cognitive Behavioral Therapy (CBT; Kendall, 2011). Behavioral Activation (BA) therapy techniques are used in sessions that address depressed affect. Emotion identification and regulation strategies are taught using Dialectical Behavior Therapy (DBT; MacPherson, Cheavens, & Fristad, 2013). Values in Action (VA) helps children to identify their personal strengths and to put them to use, thereby enhancing self-esteem. Interpersonal Therapy (IPT: Young & Mufson, 2011) techniques are used to repair relationships including with friends, peers and family members.

In each group session, the coach presents the topic of the week by defining and describing it with examples. Next, the children participate in previously planned fun activities working in displacement and then applying the topic or the lesson to their lives. These descriptions and activities are outlined in the treatment manual. Each session includes three kinds of training in the use of the technique. The first is education, thereby improving the child's knowledge base. The second type of training is applying the activities to fictional situations that give the child the opportunity to practice what is learned within the session. A home practice assignment asks the child to apply the newly acquired skill during the coming week, for further reinforcement. The home practice assignment also includes a note to parents, explaining to the child parent what the child learned that session so their parent can help them practice the new skill over the coming week. Each subsequent session begins with an individual check-in that is recorded by the group leader, with various rewards (e.g., stickers) given for those who have completed their home practice and encouragement for others to overcome barriers and to try again. A certificate of completion and celebration is held on the final day of the program to highlight everyone's accomplishments and encourage children to continue to use the lessons learned in the Kids' Empowerment Program throughout their life.

Measures

Demographics. All parents completed a demographic form. This form included questions about the child's age, gender, and ethnicity, the parent's highest education level, and a rating of their financial situation compared to other people (ranging from much worse to much better).

Social Competence . Assessment of the child's use of prosocial skills and emotion

regulation in social settings was measured via parent report on The Social Competence Scale-Parent Version (SCS-P; Conduct Problems Prevention Research Group (CPPRG), 1995). The SCS-P consists of 12 items measuring a child's positive social behaviors, communication skills, and self-control as perceived by the parent. Each item presents a behavior a child might display in a social setting and asks the parents to identify how well each statement describes their child, using a 0-"not at all" to a 5-"very well" Likert scale. The measure includes two subscales defined as prosocial/communication skills and emotional regulation skills. A total social competence score is derived from the combination of these two subscales. The SCS-P demonstrates high internal consistency measures for the total score and subscales (prosocial behaviors $\alpha = 0.80$ and emotion regulation $\alpha = 0.80$; CPPRG, 1995; Howell et al., 2013). In the present study, Cronbach alphas were for 0.811 the total score, 0.88 for the prosocial behaviors subscale, and 0.81 for the emotion regulation subscale.

Emotion Regulation. The child's emotion regulation skills were also measured via self-report on The Cognitive Emotion Regulation Questionnaire (CERQ-k; N Garnefski, Kraaij, & Spinhoven, 2002). The CERQ-k measures nine domains of cognitive emotion regulation strategies (i.e., self-blame, other blame, acceptance, planning, positive refocusing, rumination, positive reappraisal, putting into perspective, and catastrophizing) with 36 items and 4 items per sub-scale. Each question began with the prompt "When something unpleasant happens…" For example, item one, part of the self-blame subscale, would be read as "When something unpleasant happens, I think that I am to blame." Children were instructed to respond using the 5 point Likert scale: 1- Almost never, 2- Sometimes, 3- Regularly, 4- Often, or 5- Almost always. Empirical research involving the CERQ has demonstrated solid reliability and validity, with Cronbach's alpha reliabilities for the 9 subscales ranging from 0.75 to 0.86 (Nadia Garnefski &

Kraaij, 2007). Reliability estimates for each of the CERQ-K subscales in the present study are listed in Table 3.2. For the sub-scale of acceptance, reliability estimates were 0.57 initially and 0.68 with the item "I think that I have to accept it" dropped. Since dropping this item significantly improved the reliability of this subscale, the current acceptance subscale includes only "It just happened, there is nothing I can do about it", "I think that I can't change it", and, "I think that I can't do anything about it".

Internalizing symptoms. Child self-report on the 25 item Revised Children's Anxiety and Depression Scale (RCADS; Ebesutani et al., 2012) was used to assess the child's internalizing behaviors of anxiety and depression. The RCADS has solid reliability, test-retest reliability, concurrent as well as discriminant validity and has been used in hundreds of studies of children's mental health (Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000; Piqueras, Martín-Vivar, Sandin, San Luis, & Pineda, 2017). It is available in 9 languages. A meta-analysis found the RCADS full scale to have excellent mean reliability, with a mean alpha value of 0.93 (Piqueras et al., 2017). The anxiety scale had a mean alpha of 0.93 and the depression scale had a mean alpha of 0.85. In the present study, reliability for the RCADS was 0.86 for the total scale, and 0.80 and 0.76 for the anxiety and depression subscales, respectively.

Parents' perceptions of their child's internalizing behaviors of anxiety and depression were assessed with the 25 item Revised Children's Anxiety and Depression Scale-Parent Version (RCADS-P; Ebesutani, Tottenham, & Chorpita, 2015). The RCADS-P has high internal consistency, solid reliability, test-retest reliability, and good concurrent as well as discriminant validity (Ebesutani et al., 2010). Previous studies observed Cronbach's alpha reliabilities of 0.93 for the total score, 0.91 for the anxiety total subscale, and 0.80 for the depression total subscale.

In the present study, reliability for the RCADS was 0.77 or the total scale, 0.66 for the anxiety subscale, and 0.694 for the depression subscale.

Quality of Parent Child Relationships. Quality of Parent-Child relationships was measured via the Adult Child Relationship Scale (ACRS) completed by the child's parent. The ACRS was adapted from Pianta and Steinberg's Student-Teacher Relationship Scale to assess the quality of the relationship between a child and their parent (Pianta, Nimetz, & Bennett, 1997). In this 15-item scale, parents rate each item to describe their relationship with their child on a 5 point Likert scale. Scoring provides a summary score for two factors: closeness and conflict. Previous studies have reported high internal consistency for school-aged children (closeness α = 0.794; Savell, Womack, Wilson, Shaw, & Dishion, 2019) . In the present study, reliability of the conflict scale was 0.93 and reliability for the closeness scale was 0.76.

Stress exposure. At both time 1 and time 2, parents complete a Distressing Events Checklist for Kids (DECK; Graham-Bermann & Roberts, 2019) that consists of 41 items describing stressful and distressing events that their child may have experienced. While existing measures of childhood aversity focus on traumatic events in childhood (e.g. abuse, neglect), the research suggests that more common negative events in childhood also impact childhood mental health (Platt, Williams, & Ginsburg, 2015; Willian, Long, & Phipps, 2016) (Platt et al., 2016; Willard et al., 2016). To address the lack of a developmentally appropriate measure of negative life experiences for school-aged children, our lab developed the DECK based on pilot data from the current study. This measure was developed based on aggregate responses from child interviews where children provided responses to the question "What is the most upsetting event that has happened to you?" A total score consisting of the sum of distressing events is calculated to determine how exposure to negative life events in childhood influence the relationship

between resilience factors (e.g. social support and coping skills) and outcomes (e.g. anxiety and depression).

Data Analytic Strategy

For the purposes of this dissertation, participants were collapsed across sites (community and school-based programs) for the initial models. Treatment site was included as a covariate in subsequent models to determine the relative influence of school versus community settings on the program outcomes. Cronbach's alphas were calculated as measures of each scale's internal consistency. Measures of skewness and kurtosis were assessed for all measures to ensure normality. Measures with a kurtosis greater than 1 or less than -1 or a skewness greater than 3 or less than -3 were log transformed prior to running regression analyses. Change scores were computed for each subscale by subtracting time 1 scores from time 2 scores. For continuous variables, means (standard deviations) for time 1, time 2, and change scores are reported by group (See Table 3.3 and Table 3.4). For the parent questionnaire, the parent reported anxiety and depression summary scores showed kurtosis greater than 1. The original means are presented in Table 3.4. However, for all subsequent regression analyses we log transformed the time 1, time 2, and change scores and used those variables as predictors in the model.

The data analyses procedures differed for the child and parent questionnaires. In order to address aims 1 and 2, we compared groups based on condition (intervention versus waitlist) and on number of treatments sessions attended for both the child and parent questionnaire data sets. By investigating number of sessions attended, we were able determine the impact of treatment dosage (i.e. the amount of treatment received, measured by sessions attended) on outcomes. For waitlist participants, number of sessions attended = 0. For the intervention group, number of sessions attended ranged from 1 – 12 sessions (mean = 9.79, *SD* = 2.59). Number of sessions was

used as a continuous variable so we could investigate the impact of increased attendance on outcomes.

For the child interview, data from 19 children (16 experimental, 3 waitlist; 9% of the total sample) was missing. Missing data was managed with multiple imputation techniques based on best practices in longitudinal analyses (Jakobsen, Gluud, Wetterslev, & Winkel, 2017; Little & Yau, 1996). Littles' test of missingness was performed and it was not significant (X^2 (1042, N = 200) = 261.867, p = 1.000) suggesting that the data were missing completely at random (MCAR). Recent literature states that if there is reasonable doubt that the data are MCAR, even if Little's test was insignificant, and greater than 5% of the data are missing, multiple imputation is warranted to ensure the results are not biased (Jakobsen et al., 2017). Since 9% of the data was missing, multiple imputation was completed via PROC MI in SAS. We used the Markov Chain Monte Carlo (MCMC) method and multiple chains, which completes 200 burn-in iteration before each imputation, to impute 40 data sets. The 200 burn-in iterations are used to make the iterations converge to the stationary distribution before the imputation. After imputation, regression analyses were completed using the MIANALYZE procedure. This procedure reads parameter estimates and associated standard errors or covariance matrices that are computed by the regression for each imputed data set. The MIANALYZE procedure than combines the results of the analyses on each imputed data set in order to generate a valid statistical inference for the full sample. All regression analyses predicting change scores controlled for time 1 levels as change may vary as a function of starting levels due to ceiling and floor effects. For aim 1, regression analyses examined the association between participating the intervention (i.e. treatment condition or treatment dosage) and changes in child reported anxiety or depression from time 1 to time 2 controlling for child reported anxiety or depression at time 1. For aim 2,

regression analyses examined the association between participating the intervention (i.e. treatment condition or treatment dosage) and changes in child reported emotion regulation skills from time 1 to time 2 controlling for child reported emotion regulation skills at time 1 A level of 0.05 was used to assess statistical significance.

For the parent questionnaire, only 3 participants had missing data. Since the proportion of missing data was below the 5% threshold for multiple imputation suggested by best practices (3.2%), this data was not imputed (Jakobsen et al., 2017). Regression analyses predicting change scores controlled for time 1 levels since change may vary as a function of starting levels due to ceiling and floor effects. For aim 1, regression analyses examined the association between participating the intervention (i.e. treatment condition or treatment dosage) and changes in parent reported anxiety, depression or parent-child closeness or conflict from time 1 to time 2 controlling for parent reported anxiety, depression or parent-child closeness or conflict at time 1. For aim 2, regression analyses examined the association between participating the intervention (i.e. treatment condition or treatment dosage) and changes in parent reported prosocial behaviors or emotion regulation from time 1 to time 2 controlling for parent reported prosocial behaviors or emotion regulation at time 1. To address aim 3, mediation using bootstrap process macro in SAS assessed whether changes in parent-reported prosocial behaviors or emotion regulation mediated the association between participating in the intervention and changes parent reported anxiety, depression or parent-child closeness or conflict from time 1 to time 2.

Finally, aim 4 sought to explore whether stress exposure (e.g. total score on the DECK at time 1) moderated the relationship between participating in the intervention and changes in prosocial behavior, emotion regulation, parent child relationship quality, anxiety, or depression. In these models, DECK score and its interaction with the predictors were added into the

regression analyses to determine whether stress exposure impacted the relationship between the intervention and outcomes. For the regression analyses assessing the impact of stress exposure on the relationship between the intervention and coping skills, child interview data was included only for with complete Time 1 parent questionnaire data (n = 92; 54 experimental).

Finally, we conducted sensitivity analyses on all regressions with significant findings to see if any results were impacted by location, age, gender, or ethnicity. Location reflects whether participants were recruited from schools or the community. We first tested a full conditional model controlling for all 4 covariates of interest (location, age, gender, and ethnicity). If the full conditional model was no longer significant, we tested the impact of each covariate separately to identify which covariate was driving the effect.

Results

Sample characteristics

Within the experimental group, the average number of sessions attended was 9.79 sessions (*SD* = 2.59, range: 1-12). Of the 200 participants, 134 were recruited from schools (64 experimental) and 66 were recruited from the community (54 experimental). Means and standard deviations of all continuous variables are presented by group and timepoint in Table 3.3 (predictors) and Table 3.4 (outcome variables). Correlations between all continuous variables are presenting in the following tables: child interview measures- Table 3.5 (time 1) and

Table 3.6 (time 2); child interview change scores - Table 3.7; parent questionnaire measures-

Table 3.8 (time 1) and

Table 3.9 (time 2); and parent questionnaire change scores-

Table 3.10.

Aim 1: KEP intervention impact on internalizing symptoms and Adult-Child Relationship Quality

Internalizing Symptoms- Child Report. The impact of the KEP intervention on child reported anxiety and depression was previously reported (Graham-Bermann et al., n.d.). Child reported total anxiety at time 1 was inversely related to anxiety change such that the higher the anxiety at time 1, the less anxiety changed from time 1 to time 2 (r = -0.459, p <0.001). Given this association, child reported anxiety at time 1 was included in all analyses predicting change.

There were no significant differences in child-reported anxiety levels at time 1 between the experimental or waitlist control groups (b = -0.722, p = 0.4520). In order to determine the impact of treatment condition on anxiety levels, regression analyses investigated whether condition (i.e., intervention vs. control group) was associated with change in child reported anxiety levels from time 1 to time 2, while controlling for time 1 anxiety levels. Although condition was not significantly associated with differences in child reported anxiety from time 1 to time 2 (see Table 3.11), we observed a significant interaction between condition and time 1 anxiety levels (b = -0.255, p = 0.0444), in which participating in the intervention was associated with greater reductions in anxiety among individuals reporting higher levels of anxiety at time 1. We ran a second model with time 1 anxiety levels centered at 1 standard deviation above the mean. In this model, both condition (b = -2.775, p = 0.0187) and the interaction between condition and time 1 anxiety levels (b = -0.155, p = 0.0444) were significant, suggesting that participating in the intervention was significantly associated with reductions in anxiety from time 1 to time 2 for children reporting higher anxiety levels (i.e. one standard deviation above the mean or higher) at time 1. The interaction between condition and time 1 anxiety levels remained

significant while controlling for location, sex, and ethnicity, but was only significant at trend level when age was added into the model (b = -0.233, p =0.0701) and in the full conditional model (b = -0.235, p = 0.0712).

In order to determine whether baseline anxiety levels impact engagement with the treatment (i.e. the number of sessions the child attended), regression analyses investigated whether number of sessions attended was associated with child reported anxiety levels at time 1. Number of sessions attended was not associated with child reported anxiety levels at time 1 (b = -0.125, p = 0.1740). We also found that number of sessions attended was not associated with changes in child or parent reported anxiety levels from time 1 to time 2 (see Table 3.11), suggesting that treatment dosage was not associated with reductions in anxiety.

Like in previous models, we investigated whether child reported time 1 anxiety levels influenced the relation between number of sessions attended and differences in child or parent reported anxiety from time 1 to time 2. We observed a significant interaction between number of sessions attended and child reported time 1 anxiety levels (b = -0.0252, p = 0.0347), in which attending more sessions was associated with greater reductions in anxiety among children reporting higher levels of anxiety at time 1. The observed interaction between number of sessions attended and time 1 anxiety levels remained significant while controlling for location, child sex, and child ethnicity. However, this association was only significant at trend level in the model with age (b = -0.023, p = 0.0605) and the full conditional model (b = -0.0232, p = 0.0609). The interaction between number of sessions attended and time 1 parent reported anxiety was not significantly associated with differences in parent reported anxiety from time 1 to time 2 (see Table 3.11).

There were no significant differences between child reported depression at time 1 between the experimental and waitlist control groups ($b = 0.058$, $p = 0.9273$). We observed a significant inverse relationship in which greater child and parent reported depression at time 1 was significantly correlated with greater reductions in depression symptoms from time 1 to time 2 ($r = -0.436$, $p < 0.001$). Depression levels at time 1 were included in all analyses predicting differences in depression symptoms from time 1 to time 2.

Regression analyses investigated whether treatment condition predicted differences child reported in depression symptoms from time 1 to time 2, while controlling for time 1 depression levels. Neither treatment condition nor the interaction between condition and child reported depression levels were significantly associated with change in child or parent reported depression (See Table 3.11).

We also assessed treatment engagement and the impact of treatment dosage on child reported depression symptoms, measured by the number of sessions the child attended. The number of sessions the child attended was not significantly associated with change in child reported depression levels from time 1 to time 2 (see Table 3.11). In addition, the interaction between child reported depression levels and number of sessions attended was not significantly associated with change in child reported-depression (see Table 3.11).

Internalizing Symptoms- Parent Report. The impact of the KEP intervention on parent reported anxiety and depression was previously reported (Graham-Bermann et al., n.d.). Parent reported total anxiety at time 1 was inversely related to anxiety change such that the higher the anxiety at time 1, the less anxiety changed from time 1 to time 2 ($r = -0.488$, $p = 0.0001$). Therefore, parent reported anxiety at time 1 was also included in all analyses predicting changes in anxiety levels from time 1 to time 2. There were no significant differences in parent- reported

(b = 0.1389, p = 0.8352) anxiety levels at time 1 between the experimental or waitlist control groups).

To examine the impact of treatment condition on anxiety levels, regression analyses investigated whether condition (i.e., intervention vs. control group) was associated with change in parent reported anxiety levels from time 1 to time 2, while controlling for time 1 anxiety levels. Neither condition nor the interaction between condition and time 1 parent reported anxiety were significantly associated with differences in parent reported anxiety levels from time 1 to time 2 (See Table 3.11).

In order to determine whether baseline anxiety levels impact treatment engagement (i.e. the number of sessions the child attended), regression analyses investigated whether number of sessions attended was associated with parent reported anxiety levels at time 1. Number of sessions attended was not associated with parent reported anxiety levels at time 1 (b = -0.0049, p = 0.8133). We also found that number of sessions attended was not associated with changes in parent reported anxiety levels from time 1 to time 2 (see Table 3.11), suggesting that treatment dosage was not associated with reductions in parent reported anxiety. Additionally, the interaction between number of sessions attended and time 1 parent reported anxiety was not significantly associated with differences in parent reported anxiety from time 1 to time 2 (see Table 3.11).

Parent reported depression symptoms at time 1 was significantly higher among the experimental group compared to the control group (b = -0.603, p = 0.0449). We observed a significant inverse relationship in which greater parent reported depression at time 1 was significantly correlated with greater reductions in depression symptoms from time 1 to time 2 (r

= -0.576, p = 0.0079). Depression levels at time 1 were included in all analyses predicting differences in depression symptoms from time 1 to time 2.

Regression analyses investigated whether treatment condition predicted differences parent reported in depression symptoms from time 1 to time 2, while controlling for time 1 depression levels. Neither treatment condition nor the interaction between condition and parent reported depression levels were significantly associated with change in parent reported depression (See Table 3.11).

We also assessed treatment engagement and the impact of treatment dosage on depression symptoms. Children with higher levels of parent reported depression at time 1 attended more sessions compared to children with lower levels of parent reported depression at time 1 (b = 0.058, p = 0.015), suggesting these children were more likely to engage or stick with the treatment. The number of sessions the child attended was not significantly associated with change in parent reported depression levels from time 1 to time 2 (see Table 3.11). However, we observed a significant interaction between number of sessions attended and time 1 parent reported depression levels (b = -0.089, p = 0.0407), in which attending more sessions was associated with greater reductions in depression among children exhibiting higher levels of depression at time 1. Regions of significance analyses suggested that number of sessions attended significantly predicted change in depression symptoms from time 1 to time 2 for children displaying depressive symptoms one standard deviation above the mean or more at time 1 (b = -0.0934, p = 0.005). The interaction between number of sessions attended and time 2 parent-reported depression levels remained significant while controlling for child age, gender, ethnicity, and treatment location. The interaction between child reported depression levels and

number of sessions attended was not significantly associated with change in child reported-depression (see Table 3.11).

Child and Parent Report of Internalizing Symptoms. We also investigated the relationship between child and parent reported symptoms of anxiety and depression. We observed a significant positive relationship between child reported anxiety and depression at time 1 ($r = 0.64$, $p < 0.001$) and time 2 ($r = 0.66$, $p < 0.001$) and parent reported anxiety at time 1 ($r = 0.476$, $p < 0.001$) and time 2 ($r = 0.448$, $p < 0.001$) in that higher levels of anxiety were associated with higher levels of depression at both timepoints. Change in both child reported and parent reported anxiety from time 1 to time 2 was positively related to change in child ($r = 0.52$, $p <0.001$) and parent reported depression ($r = 0.281$, $p = 0.0092$), in that greater reductions in anxiety symptoms from time 1 to time 2 was associated with greater reductions in depression symptoms. Finally, we investigated the relationship between child and parent report of anxiety and depression. Child reported anxiety was not significantly associated with parent reported anxiety at time 1 ($r = 0.280$, $p = 0.1496$) or time 2 ($r = 0.278$, $p = 0.1987$) or with differences in anxiety from time 1 to time 2 ($b = 0.053$, $p = 0.7158$). Child reported depression was also not significantly associated with parent reported depression at time 1 ($r = 0.280$, $p = 0.1496$) or time 2 ($r = 0.278$, $p = 0.1987$) or with differences in anxiety from time 1 to time 2 ($r = 0.400$, $p = 0.091$).

Adult-Child Relationship Quality. The waitlist and experimental groups did not significantly differ in parent-child closeness ($b = 0.5263$, $p = 0.4315$) or parent-child conflict ($b = -1.515$, $p = 0.4543$) at time 1. Parent-child closeness was inversely related to parent-child conflict at both time 1 ($r = -0.580$, $p < 0.0001$) and time 2 ($r = -0.445$, $p < 0.0001$), indicating that parents reporting greater parent-child closeness also reported reduced parent-child conflict.

Additionally, increases in parent-child closeness from time 1 to time 2 were associated with reductions in parent-child conflict from time 1 to time 2 (r = -0.395, p = 0.0001).

Parent-child closeness at time 1 was significantly inversely correlated with change in parent-child closeness from time 1 to time 2 (r = -0.405, $p < 0.001$), such that parents reporting greater parent child closeness at time 1 reported fewer differences in closeness from time 1 to time 2. Parent-child closeness at time 1 was included in all analyses predicting change in parent-child closeness. Regression analyses controlling for time 1 parent-child closeness found that neither treatment condition nor the interaction between treatment condition and time 1 parent-child closeness were significantly related to differences in parent-child closeness from time 1 to time 2 (see Table 3.12).

In order to determine the impact of treatment dosage, regression analyses investigated whether number of sessions attended predicted change in parent-child closeness from time 1 to time 2, while controlling for time 1 parent-child closeness. Number of sessions attended was significantly associated with change in parent-child closeness (b = 0.1255, p = 0.0217) (see Figure 3.3). Children who attended more sessions reported greater parent-child closeness at time 2 compared to time 1. The association between number of sessions attended and increases in parent-child closeness remained significant while controlling for child age, sex, ethnicity and treatment location.

Secondary models investigated whether the interaction between number of sessions attended and time 1 parent-child closeness predicted change in parent-child closeness from time 1 to time 2. The interaction between number of sessions attended and time 1 parent-child closeness was associated with change in parent-child closeness at trend level (b = -0.03325, p = 0.0578). This interaction suggests that for children at higher levels of parent child closeness at

time 1, parent-child closeness shows less change from time 1 to time 2 compared to children demonstrating lower levels of parent-child closeness at time 1. During the sensitivity analyses stage, the interaction between number of sessions attended and parent-child closeness at time 1was no longer significant with location, age, gender, and ethnicity in the model. We tested the impact of each demographic variable separately and found that the interaction between number of sessions attended and parent-child closeness at time 1 became significant while controlling for location (b = -0.03771, p =0.0303). In this model, location also significantly predicted change in parent-child closeness from time 1 to time 2 (b = -1.2027, p = 0.0442), suggesting the children in the school groups reported greater change in parent-child closeness compared to children in the community groups. This interaction was only significant at trend level when controlling for child sex (b = -0.0326, p = 0. 0.0643) and was not significant while controlling for child ethnicity or child age.

Parent-child conflict at time 1 was significantly correlated with change in parent-child conflict from time 1 to time 2 (r = -0.331, p = 0.0016). Parent-child conflict at time 1 were included in all analyses predicting change in parent-child conflict. Regression analyses investigated whether condition predicted change in parent-child conflict from time 1 to time 2, while controlling for time 1 parent-child conflict. Neither condition nor the interaction between condition and parent-child conflict at time 1 were significantly associated with change in parent-child conflict from time 1 to time 2 (see Table 3.12). There was also no significant impact of number of sessions attended or the interaction between number of sessions attended and parent-child conflict at time 1 on change in parent-child conflict from time 1 to time 2 (see Table 3.12).

Parent-Reported Internalizing Symptoms and Adult-Child Relationship Quality. We investigated whether changes in parent-child closeness from time 1 to time 2 were associated

with change in parent-reported anxiety and depression from time 1 to time 2. Change in parent-child closeness from time 1 to time 2 was not significantly associated with change in parent-reported anxiety (see Table 3.13). Changes in parent-child closeness from time 1 to time 2 were significantly associated with change in parent-reported depression from time 1 to time 2 (b = -0.0921, p = 0.019), in which parents who reported greater increases in feelings of closeness with their child also reported reductions in depression symptoms from time 1 to time 2 (see Figure 3.4). The association between changes in parent-child closeness and parent reported depression from time 1 to time 2 remained significant while controlling for child age, gender, ethnicity and treatment location.

We also examined the association between changes in parent-child conflict and changes in parent-reported anxiety and depression from time 1 to time 1. Greater reductions in parent-child conflict from time 1 to time 2 was significantly associated with greater reductions in parent-reported anxiety from time 1 to time 2 (b = 0.1032, p = 0.0096) (see Figure 3.4). Changes in parent-child conflict remained significantly associated with change in parent-reported anxiety in the models controlling for child age, gender, ethnicity, and treatment location. Changes in parent-child conflict from time 1 to time 2 were also significantly associated with changes in parent-reported depression from time 1 to time 2 (b = 0.05104, p = 0.0103) (see Figure 3.5). Parents who reported greater reductions in parent-child conflict also reported reductions in depression symptoms from time 1 to time 2. Changes in parent-child conflict remained significantly associated with change in parent-reported depression in the models controlling for age, gender, ethnicity, and treatment location.

Aim 2: Impact of KEP intervention on prosocial behaviors and emotion regulation skills

Prosocial Behaviors. There were no significant differences in prosocial behaviors at time 1 between the experimental or waitlist control groups (b = 0.02047, p = 0.9845). Prosocial behaviors at time 1 were significantly correlated with change in prosocial behaviors from time 1 to time 2 (r = -0.435, $p < 0.001$), therefore, prosocial behaviors at time 1 were included in all analyses predicting change prosocial behaviors. Regression analyses investigated whether treatment condition predicted change in prosocial behaviors from time 1 to time 2, while controlling for prosocial behaviors at time 1. Neither condition not the interaction between condition and prosocial behaviors were significantly associated with change in prosocial behaviors from time 1 to time 2 (see Table 3.14).

In order to examine the relationship between treatment dosage and changes in prosocial behaviors, we investigated whether number of sessions attended predicted change in prosocial behaviors from time 1 to time 2, while controlling for prosocial behaviors at time 1. We did not observe a significant association between number of sessions attended or the interaction between number of sessions attended and time one levels of prosocial behaviors and change in prosocial behaviors from time 1 to time 2 (see Table 3.14).

Emotion Regulation- Parent Report. There were no significant differences in parent reported emotion regulation at time 1 between the experimental or waitlist control groups (b = 0.3606, p = 0.677). Parent reported emotion regulation at time 1 was significantly negatively correlated with change in emotion regulation from time 1 to time 2 (r = -0.355, p =0.0007), in that parents reporting greater emotion regulation skills among their children at time 1 showed less change from time 1 to time 2. Emotion regulation at time 1 was included in all analyses predicting change in emotion regulation. Regression analyses investigated whether condition predicted change in emotion regulation from time 1 to time 2, while controlling for emotion

regulation at time 1. Condition was associated with change in emotion regulation at trend level (b = -1.1957, p = 0.0630), suggesting that children in the intervention group demonstrated reductions in emotion regulation skills from time 1 to time 2. The interaction between condition and emotion regulation at time 1 was not significantly associated with change in emotion regulation from time 1 to time 2 (see Table 3.14).

Using regression, we investigated whether number of sessions attended predicted change in emotion regulation from time 1 to time 2, while controlling for emotion regulation at time 1. Number of sessions attended was associated with change in emotion regulation (b = 0.1913, p = 0.0032). Parents of children who attended more sessions reported increased use of emotion regulation skills from time 1 to time 2. The association between number of sessions attended and greater emotion regulation skills remained significant while controlling for child age, gender, ethnicity, and treatment location. The interaction between number of sessions attended and emotion regulation at time 1 was not significantly associated with change in emotion regulation (see Table 3.14).

Emotion regulation – Child Report. Correlations among the CERQ-k sub-scales are presented in Table 3.7. For all child-reported emotion regulation sub-scales, time 1 levels significantly predicted time 1 to time 2 change. Therefore, time 1 levels were included in all regression analyses. Regression analyses examined whether treatment condition predicted differences in each emotion regulation sub-scale from time 1 to time 2, while controlling for time 1 levels. Condition was not associated with significant change from time 1 to time 2 for the subscales of self-blame, other blame, acceptance, planning, positive refocus, rumination, positive reappraisal, perspective taking, or catastrophizing (see Table 3.15 to Table 3.17). We observed a trend-level interaction between time 1 catastrophizing and condition (b = -0.260, p = 0.0700), in

which children in the experimental condition reported greater reductions in the use of catastrophizing from time 1 to time 2 compared to children in the waitlist control condition. No other significant interactions were observed for any of the child-reported emotion regulation subscales (see Table 3.15 and Table 3.17).

We also investigated whether treatment dosage, measured by the number of sessions the child attended, was associated with differences in self-reported use of emotion regulation skills from time 1 to time 2, while controlling for time 1 levels. Number of sessions attended was not significantly associated with differences in emotion regulation skills from time 1 to time 2 for self-blame, other blame, acceptance, planning, positive refocus, rumination, perspective taking, or catastrophizing (see Table 3.15 and

Table **3.17**). However, children who attended more sessions reported significantly greater use of positive appraisal (b = 0.125, p = 0.0306), from time 1 to time 2. The finding remained significant while controlling location, child sex, child age, and child ethnicity. We also observed a trend-level interaction between time 1 catastrophizing and number of sessions (b = -0.0245, p = 0.0746), in which children in who attended a greater number of sessions reported greater reductions in the use of catastrophizing from time 1 to time 2. No other significant interactions were observed (see Table 3.15 to

Table **3.17**).

Aim 3: Changes in prosocial behaviors and emotion regulation as a mechanism by which the KEP intervention influences internalizing symptoms and parent-child relationships

Prosocial Behaviors. We investigated whether changes in prosocial behaviors were associated with changes in internalizing symptoms or parent-child relationships. Changes in prosocial behaviors from time 1 to time 2 were not significantly associated with changes in parent-reported anxiety (b = -0.0546, p = 0.4482) or depression (b = -0.0451, p = 0.2082) from time 1 to time 2. However, we observed an significant impact of changes in prosocial behaviors on change in parent-child closeness (b = 0.409, $p < 0.001$). Parent who reported greater increases in their child's use of prosocial behaviors from time 1 to time 2 also reported greater increases in their feelings of closeness with their child (see Figure 3.6). In addition, changes in prosocial behaviors were significantly related to changes in parent-child conflict from time 1 to time 2 (b = -0.456, p = 0.0229), in that parents who reported greater use of prosocial behaviors among their children also reported reduced conflict with their children from time 1 to time 2 (see Figure 3.6). Both the association between prosocial behaviors and parent-child closeness and the association between prosocial behaviors and parent-child conflict remained significant while controlling for child age, sex, ethnicity, and treatment location.

Emotion regulation. We also investigated the association between changes in emotion regulation skills from time 1 to time 2 and changes in parent and child reported anxiety and depression from time 1 to time 2. Increases in parent-reported emotion regulation skills from time 1 to time 2 were associated with reductions in parent-reported anxiety (b = -0.2641, p <0.001) and parent-reported depression (b = -0.0833, p = 0.0131) from time 1 to time 2 (see Figure 3.7). The association between changes in parent-reported emotion regulation and parent-

reported anxiety and depression remained significant while controlling for child age, sex, ethnicity, and treatment location. We also observed a significant relationship between changes in parent-reported emotion regulation skills and parent-child closeness (b = 0.2454, p = 0.0047) and conflict (b = -0.4997, p = 0.0062). Parents who reported that their child demonstrated increases in emotion regulation skills from time 1 to time 2 also reported increases in feelings of closeness with their child and reductions in parent-child conflict (see Figure 3.8). These associations also maintained significant while controlling for child age, sex, ethnicity, and treatment location.

We also examined whether changes in child-reported emotion regulation skills from time 1 to time 2, were associated with change in child reported anxiety from time 1 to time 2, controlling for time 1 emotion regulation and time 1 child reported anxiety levels. We observed significant relationships between changes in self-blame (b = 0.451, p = 0.001), acceptance (b = 0.571, p = 0.0005), rumination (b = 0.315, p = 0.0030), and catastrophizing (b = 0.320, p = 0.0129) from time 1 to time 2 and changes in child reported anxiety from time 1 to time 2. Children who reported greater reductions in self-blame, acceptance, rumination, and catastrophizing from time 1 to time 2 also reported greater reductions in anxiety symptoms from time 1 time 2. All associations remained significant while controlling for child age, sex, ethnicity and location. Changes in other blame (b = 0.233, p = 0.2620), planning (b = -0.004, p = 0.9676), positive refocusing (b = 0.054, p = 0.5740), positive appraisal (b = 0.010, p = 0.9215), and perspective taking (b = 0.181, p = 0.1086) from time 1 to time 2 were not significantly associated with child reported change in anxiety from time 1 to time 2.

Regression analyses also investigated whether changes in emotion regulation skills from time 1 to time 2 were associated with child reported depression change from time 1 to time 2 while controlling for time 1 emotional regulation and time 1 child reported depression levels,.

Reductions in the use of self-blame ($b = 0.40$, $p < 0.0001$), other blame ($b = 0.30$, $p = 0.0396$), acceptance ($b = 0.56$, $p = 0.0014$), rumination ($b = 0.242$, $p = 0.0014$), and catastrophizing ($b = 0.260$, $p = 0.0034$) from time 1 to time 2 were significantly associated with reductions in child reported depression symptoms from time 1 to time 2. All associations remained significant while controlling for child age, sex, ethnicity and location. Changes in planning ($b = -0.067$, $p = 0.4086$), positive refocusing ($b = -0.080$, $p = 0.2481$) , positive appraisal ($b = -0.103$, $p = 0.1458$), and perspective taking ($b = 0.0004$, $p = 0.9956$) were not significantly associated with change in child reported depression from time 1 to time 2.

Mediation Analyses. As detailed in the previous sections, attending a greater number of sessions was associated with increased use of parent-reported emotion regulation skills and greater parent-child closeness from time 1 to time 2. In addition, increases in parent-reported emotion regulation skills from time 1 to time 2 was associated with increases in parent-child closeness from time 1 to time 2. Given these relations, we sought to determine whether changes in parent-reported emotion regulation skills from time 1 to time 2 mediated the impact of attending more sessions on changes in parent-child closeness from time 1 to time 2. We used the CAUSALMED procedure in SAS to estimate the direct and indirect effects. We did not observe an indirect effect, therefore, changes in emotion-regulation did not mediate the impact pf attending more sessions on changes in parent-child closeness (see Table 3.18).

Aim 4: The impact of stress exposure on prosocial behaviors, emotion regulation, and the relationship between the intervention and changes in prosocial behaviors and emotion regulation

We investigated whether stress exposure, measured by the parent-reported DECK at time 1, was associated with prosocial behaviors or parent-reported emotion regulation at time 1.

Greater stress exposure was associated with reduced parent-reported prosocial behaviors (b = -0.2763, p = 0.042) and emotion regulation skills at time 1 (b = -0.2617, p = 0.0083). We also sought to determine whether stress exposure moderated the impact of participating in the intervention on changes in prosocial behaviors and use of emotion regulation skills. Stress exposure did not moderate the association between participating in the intervention and changes in parent-reported prosocial behaviors or parent-reported emotion regulation, (see Table 3.19).

Discussion

The present study examined the impact of participating in the KEP, an innovative skills-based intervention program focused on improving well-being and promoting resilience among children ages 6 to 12 years old. We examined the impact of participating KEP on prosocial behaviors, emotion regulation skills, parent-child relationships, and internalizing symptoms. This study also investigated the moderating role of stress exposure on the association between participating in the intervention and prosocial behaviors and emotion regulation skills. Participating in the KEP was associated with reductions in child reported anxiety and parent reported depression, increased feelings of parent-child closeness, and increased use of adaptive emotion regulation skills. Although stress exposure was related to lower levels of prosocial behaviors and emotion regulation skills at time 1, stress exposure did not moderate the association between participating in the intervention and prosocial behaviors or emotion regulation skills. These results support KEP as an effective intervention program that influences both mental and social well-being outcomes as well as increases children's repertoire of emotion regulation skills that are necessary to effectively cope with environmental stressors.

This study replicated previously findings from our lab regarding the impact of KEP on internalizing psychopathology (Graham-Bermann et al., n.d.). While we did not find a main

effect of treatment condition or number of sessions attended on child or parent-reported anxiety or depression, we observed a significant interaction in which participating in the intervention was significantly associated with reductions in child reported anxiety symptoms for children reporting higher anxiety levels at time 1. Regions of significance analyses suggested that for children exhibiting anxiety symptoms 1 standard deviation above the mean, participating in the intervention was significantly associated with reductions in anxiety symptoms from time 1 to time 2. We observed a similar interaction between number of sessions attended and parent-reported depression symptoms, in which attending more sessions was associated with greater reductions in depression among children exhibiting higher levels of depression at time 1. The lack of main effects for treatment condition or number of sessions attended may be due in part to the low prevalence of these symptoms in this age group. Specifically, the mean anxiety and depression scores in this sample were 10.82 and 7.47 based on child report. Parent report of anxiety and depression symptoms was significantly lower, with average anxiety ratings at 2.94 and average depression ratings at 1.41. The low rates of symptomatology in this sample is not surprising given that the prevalence of depressive disorders is only 3.7% among this age group (Merikangas et al., 2010) and the average age of onset falls between 11 and 14 years of age (Lewinsohn, Rohde, Seeley, & Fischer, 1993; Merikangas, Nakamura, & Kessler, 2009). The prevalence rates of anxiety disorders in childhood vary, with studies reporting prevalence rates ranging from 3.5% to 23.9% of elementary school children (Cartwright-Hatton, McNicol, & Doubleday, 2006). Despite these variable findings, anxiety appears to be more common than depression in children under 12 years old with approximately 1 in every 30 elementary children meeting criteria for an anxiety disorder (Cartwright-Hatton et al., 2006). Therefore, the low prevalence of clinically significant symptoms of anxiety and depression in this sample, although

characteristic of this developmental period, may partially explain the lack of main effects for treatment condition and number of sessions attended.

Participating in the KEP intervention was also associated with increased parent reported feelings of closeness with their child. Although we did not observe an effect of treatment condition, parents reporting greater treatment engagement (i.e. attending more sessions) reported greater feelings of closeness with their children at time 2. We also observed a significant interaction in which children at lower levels of parent child closeness at time 1 showed greater change from time 1 to time 2 compared to children demonstrating higher levels of parent-child closeness at time 1. Increased parent-child closeness from time 1 to time 2 was associated with significant reductions in parent-reported depression from time 1 to time 2. The association between participating in the KEP intervention and increased parent-child closeness may be related to the skills taught in the KEP intervention. During weekly sessions, children learn how to identify and effectively regulate emotions and evaluate and solve problems. These lessons may promote increased communication about emotions between parents and children and children may seek support from parents in order to manage strong emotions and solve problems. Models of mindful parenting suggest that parents who take a more child-oriented approach to parenting, that is acknowledging and accounting for the child's needs, wants, and feelings, may exhibit closer parent-child relationships (Duncan & Caughy, 2009). Therefore, the increased communication between children and parents in response to the lessons learned in KEP may increase the parent's ability to respond with a child-oriented perspective and promote parent-child closeness.

Parent-child closeness was significantly inversely related to parent-child conflict, suggesting that parents who felt closer to their child also perceived less conflict in their

relationship. Although reductions in parent-child conflict were associated with increases in parent-child closeness, participating in the KEP intervention was not significantly related to reductions in parent-child conflict from time 1 to time 2. However, significant reductions in parent-child conflict from time 1 to time 2 were associated with significant decreased in parent-reported anxiety and depression. These findings suggest that while the KEP intervention itself did not promote significant decreases in parent-child conflict, parents who observed reductions in their child's anxiety and depressive symptoms did report less parent-child conflict. School-aged children suffering from depression or anxiety may be more irritable and angry (Sukhodolsky, Smith, McCauley, Ibrahim, & Piasecka, 2016) and demonstrate more academic difficulties (Lundy, Silva, Kaemingk, Goodwin, & Quan, 2010) and behavior problems at school (DeSocio & Hootman, 2004). These difficulties may lead to greater conflict with the child's parents. As the internalizing symptoms and corresponding behavioral problems improve, parent-child conflict may decrease. Therefore, the observed association between reduced parent-child conflict and improved internalizing psychopathology may reflect improvements in the behavioral correlates of anxiety and depression among school-aged children that exacerbate parent-child conflict.

Children who participated in the KEP intervention also reported greater use of emotion regulation skills. Children in the treatment condition and those with greater treatment engagement showed significant increases in parent-reported emotion regulation skills from time 1 to time 2. Additionally, children who attended more sessions reported significantly increased use of positive reappraisal in response to unpleasant events. Children demonstrating higher levels of catastrophizing at time 1 showed trend-level reductions in their use of catastrophizing as a result of participating in the intervention and attending more sessions. Further, increases in

parent-reported emotion regulation skills from time 1 to time 2 were associated with reductions in parent-reported anxiety and depression from time 1 to time 2. Decreased use of self-blame, acceptance, rumination, and from time 1 to time 2 was significantly related to decreased child reported anxiety and reductions in the use of self-blame, other blame, acceptance, rumination, and catastrophizing were significantly associated with reductions in child reported depression symptoms. This data is in line with previous literature suggesting that children who engage in greater use of rumination, avoidance, or suppression of emotions display greater symptoms of anxiety and depression (Aldao & Nolen-Hoeksema, 2010; Aldao et al., 2010; Compas et al., 2017). Our findings replicate previous studies demonstrating the children exhibiting a greater repertoire of emotion-regulation skills and utilizing fewer maladaptive emotion regulation skills show reduced rates of internalizing psychopathology (Compas et al., 2017). Taken together, these data suggest that children who participated in the KEP intervention learned new emotion regulation skills and showed some decrease in the use of maladaptive emotion regulations skills.

Neither treatment condition nor the number of sessions attended were associated with a change in prosocial behaviors from time 1 to time 2. While the KEP intervention does promote collaborative work between children and emphasizes emotion regulation skills, there is only minimal focus on social skills training. Therefore, the lack of a main effect of the intervention on prosocial behavior may result from less training in this areas compared to areas such as emotion identification and regulation, and problem solving. However, parents who reported greater increases in their child's use of prosocial behaviors from time 1 to time 2 also reported greater increases in their feelings of closeness and greater reductions in parent-child conflict from time 1 to time 2. It's possible that parents noticed increased prosocial behaviors in the parent-child interactions, contributing to their report of greater feelings of closeness and reductions in conflict

with their child. Whether or not these prosocial behaviors extended beyond the parent-child relationship remains unknown.

Finally, aim 4 examined the impact of stress exposure on prosocial behaviors and emotion regulation skills. Greater stress exposure was associated with reduced parent-reported prosocial behaviors and emotion regulation skills at time 1, replicating previous research demonstrating that children exposed to adversity exhibit greater difficulties regulating emotions and show fewer prosocial behaviors (Anthonysamy & Zimmer-Gembeck, 2007; Cicchetti et al., 1991). Stress exposure did not influence the association between participating in the intervention and changes in prosocial behaviors or emotion regulation skills. The current study utilized a broader measure of distressing events that children may experience in order to examine the impact of a range upsetting events rather than focusing exclusively on childhood trauma. It is possible that the experience of more severe childhood adversities (i.e. maltreatment) compared to more common negative experiences (i.e. bullying, physical injury), may differentially impact the association between participating in the intervention and changes in prosocial behaviors or emotion regulation skills. Future studies should investigate how different types of life events influence the effectiveness of the KEP intervention on improving prosocial behaviors and emotion regulation skills.

While this study had many strengths, it also had some limitations. First, we did not have both child and parent report on all measures and we had significantly fewer complete parent questionnaires compared to complete child interviews. Previous studies suggest that generally poor agreement exists between parents and children on diagnostic instruments and questionnaires (Bird, Gould, & Staghezza, 1992). For instance, in the current study, there were no significant associations between parent and child reported depression or anxiety at time 1, time 2, or the

change between time 1 and time 2. Parental mental health may partially explain this poor agreement. Parents currently suffering from mood disorders have been shown to rate their children higher on internalizing psychopathology compared to parents in remission (Maoz et al., 2014). Since we did not measure parental mental health, we cannot know what role this may have played in our findings. Additionally, the smaller sample size associated with parent-report data may have limited our ability to detect smaller effects. Secondly, the current study only includes data from two timepoints. Data collection for a third timepoint, 6 months after children participated in the intervention, was ongoing at the time of this study. Since we only include the data from two timepoints, we cannot make any claims regarding the longevity of the changes associated with participating in the intervention. In addition, this study did not utilize a fully randomized design. Although classrooms were randomized to active intervention or waitlist control, participants in the community groups were enrolled in groups until the groups were full and then extra participants were enrolled in the waitlist groups. Additional evaluations using a fully randomized design are needed to ensure that the community groups were not biased. Further, the reliance on self-report data may introduce bias. Future studies may consider utilizing more observational and interview methods to bolster the reliability of the self-report measures. Finally, all evaluations were conducted in southeast Michigan and participants were primarily Caucasian and non-Hispanic and came from more affluent households with highly educated parents. Income level may affect access-to-care (Hodgkinson, Godoy, Beers, & Lewin, 2017). For instance, children from lower income households may not transportation to an afterschool program that is not at their school. Further, children belonging to traditionally marginalized racial and ethnic groups may experience structural adversity and discrimination which may influence treatment effectiveness and likelihood to pursue treatment (Villatoro, Mays, Ponce, &

Aneshensel, 2018). Additional research is needed to determine the efficacy of this intervention among youth with more diverse social, racial, and ethnic backgrounds.

This study also had a number of strengths. KEP represents a much needed skills-based intervention program for kids. The group format and ability for this program to be run by paraprofessionals and in both community and school settings increases access to care. By focusing on specific factors related to resilience, namely parent-child relationships, prosocial behaviors, and emotion regulation skills, in addition to symptoms of anxiety and depression, we were able to identify some of the mechanisms by which this intervention promotes positive well-being. Understanding the mechanisms contributing to treatment response provides important information regarding why and how an intervention promotes positive effects. We also examined the role of stress exposure more broadly that previous studies. The majority of past research focuses only on more severe childhood adversities such as maltreatment. The measure created by our lab provides a more holistic assessment of the impact of upsetting events by including a number of different types of upsetting events with ranging severity. In this way, we were able to assess both the impact of more severe negative experiences in childhood as well as more normative events that children also perceive as upsetting.

In conclusion, the current study suggests that participating in the KEP intervention is associated with reductions in internalizing symptoms, increases in parent-child closeness, and increases in children's use of adaptive emotion regulation skills. Given that parent-child relationships and emotion regulation skills have been linked with resilience among stress-exposed children, the KEP intervention may foster resilience by promoting the development of these skills. Finally, the KEP intervention appears to effectively impact well-being when disseminated in both schools as well as community settings, increasing access to care.

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Table 3.1 Kids' Empowerment Program Sample Demographics

Age	8.97 years (SD=1.51)	**Parent Education**	
Sex		*< High school*	1.05%
Female	101	*High School Degree*	1.58%
Male	97	*Some college, tech*	4.21%
Race/Ethnicity		*College Degree*	26.84%
Caucasian	73.02%	*Advanced Degree*	66.32%
African-American	5.82%	*Missing*	5%
Biracial	7.41%	**Parent Financial Situation**	
Asian, Asian American	5.82%	*Much Worse*	0.53%
Native American	0.53%	*Worse*	10.11%
Other	2.12%	*About Average*	32.45%
Missing	5.82%	*Better*	42.02%
		Much Better	14.89%
		Missing	6%

Figure 3.1 Consort Diagram for the Study of the Kids' Empowerment Program in Schools

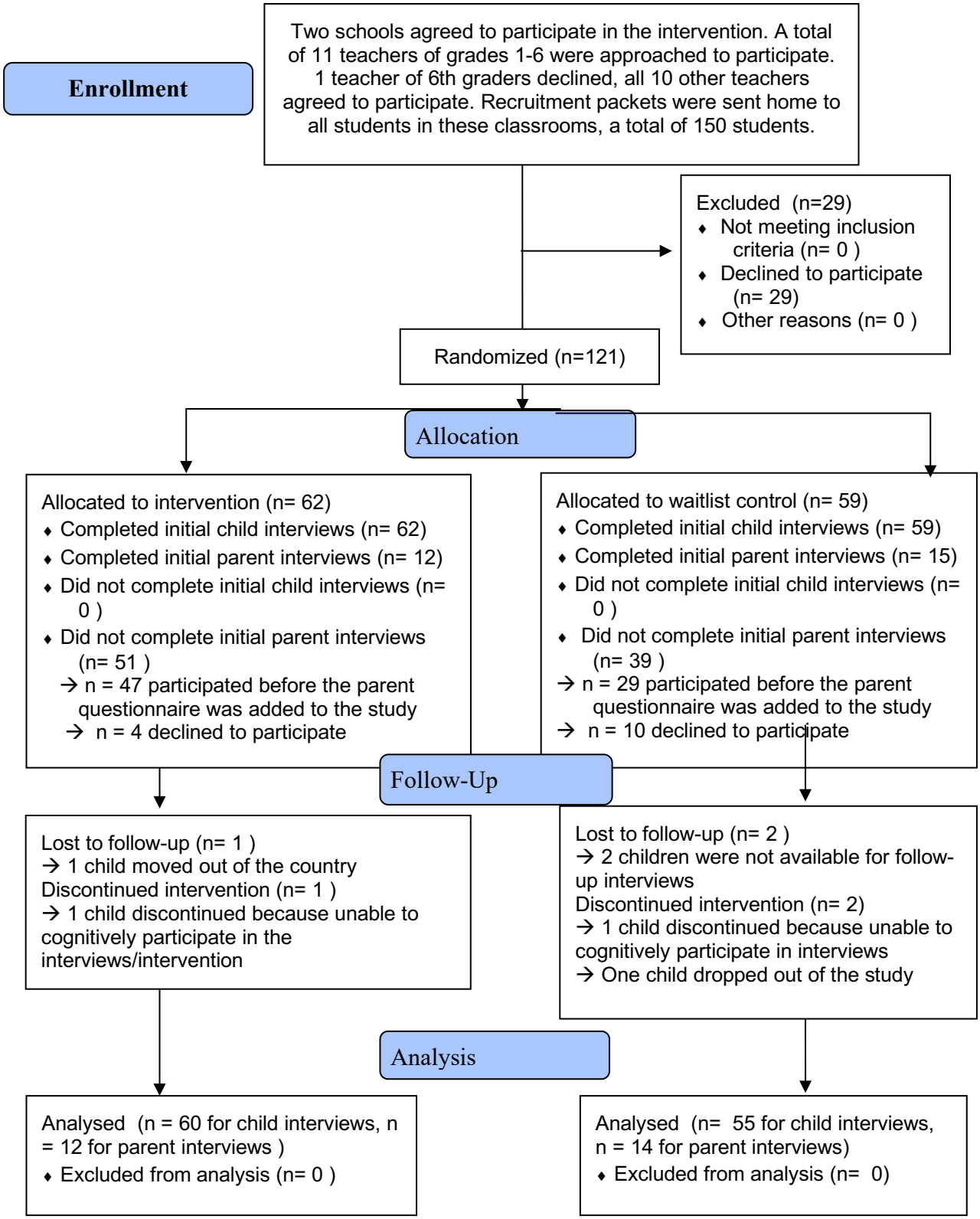


Figure 3.2 Consort Diagram for the Study of the Kids' Empowerment Program in the Community

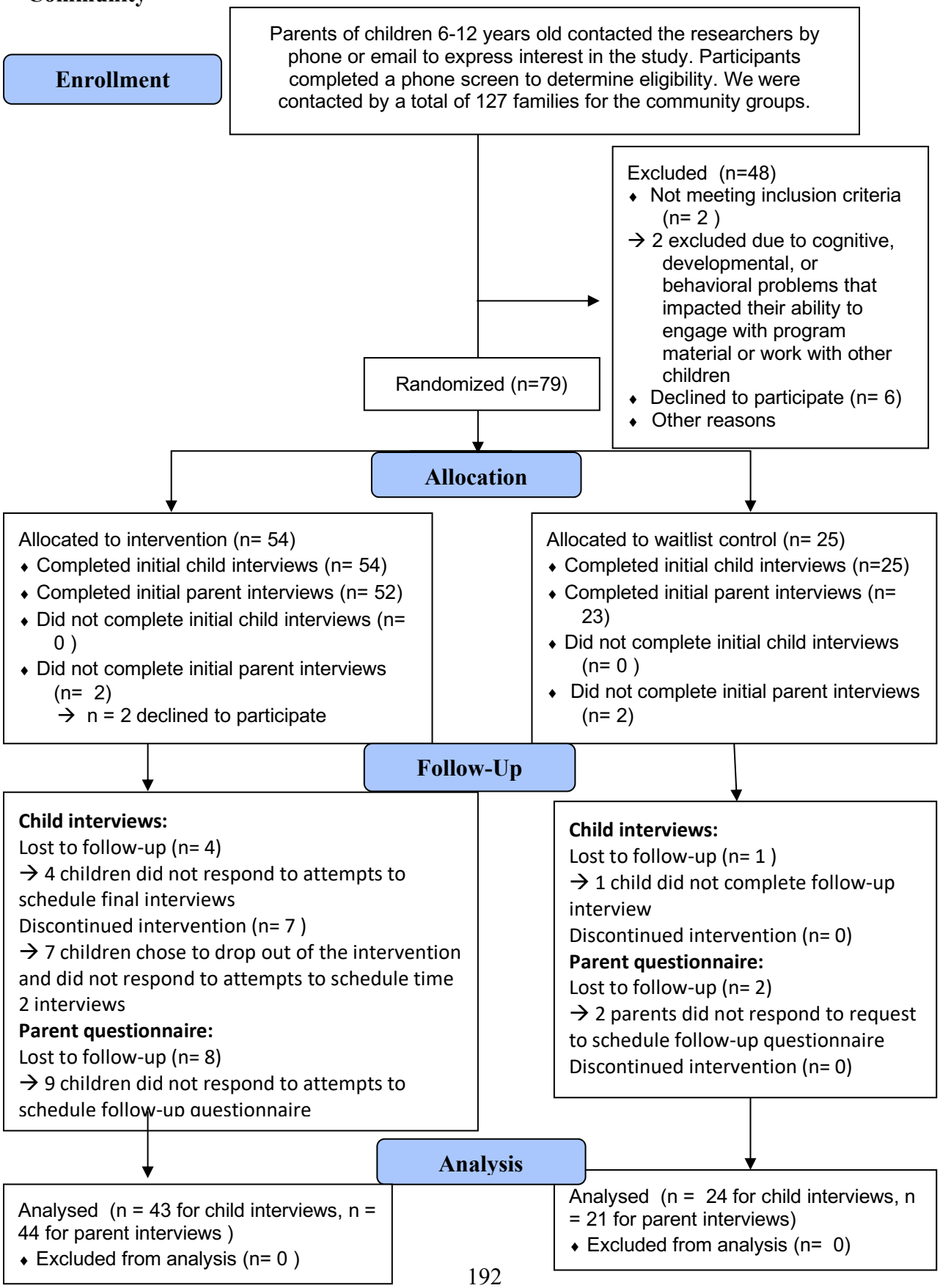


Table 3.2 Reliability of CERQ-K Subscales in the Current Sample

CERQ-K Subscale	α
Self-Blame	0.649
Other Blame	0.766
Acceptance	0.676
Planning	0.700
Positive Refocus	0.811
Rumination	0.683
Positive Reappraisal	0.676
Perspective Taking	0.561
Catastrophizing	0.558

Table 3.3 Means and Standard Deviations for Predictor Variables at Time 1 and Time 2 and Change Scores

		Experimental group (n=118) M *(SD)*			Control Group (n=82) M *(SD)*		
		Time 1	*Time 2*	*Time 2 – Time 1*	*Time 1*	*Time 2*	*Time 2 – Time 1*
SCS	*Prosocial Behavior*	19.61 *(4.90)*	21.28 *(3.10)*	1.67 *(3.30)*	19.63 *(5.08)*	20.80 *(4.65)*	1.11 *(2.41)*
	Emotion Regulation	16.48 *(3.91)*	17.94 *(4.24)*	1.47 *(3.48)*	16.84 *(4.30)*	17.03 *(3.92)*	0.17 *(2.37)*
	Total Social Competence	36.09 *(8.13)*	39.19 *(7.95)*	3.11 *(5.93)*	36.47 *(8.87)*	37.83 *(7.94)*	1.29 (*4.16)*
CERQ-K	*Self-Blame*	7.37 *(2.95)*	7.25 *(3.27)*	-0.17 (3.48)	7.92 *(3.43)*	7.53 *(3.26)*	-0.40 *(3.03)*
	Other Blame	6.17 *(2.86)*	5.72 *(2.37)*	-0.43 *(3.13)*	5.98 *(3.12)*	5.47 *(2.23)*	-0.50 *(2.61)*
	Acceptance	7.35 *(3.11)*	6.86 *(2.86)*	-0.40 *(3.65)*	7.74 *(3.22)*	7.07 *(2.83)*	-0.67 (3.19)
	Planning	13.51 *(3.84)*	13.21 *(4.07)*	-0.45 *(4.14)*	13.34 *(3.86)*	12.91 *(3.93)*	-0.44 *(3.81)*
	Positive Refocus	13.12 *(4.70)*	13.12 *(4.50)*	-0.14 (4.60)	13.76 *(4.34)*	13.18 *(5.02)*	-0.51 (4.53)
	Rumination	11.75 *(3.91)*	11.54 *(3.94)*	-0.43 (4.78)	12.01 *(4.05)*	11.55 *(3.71)*	-0.44 (4.21)
	Positive Reappraisal	11.58 *(3.75)*	12.39 *(4.36)*	0.54 *(4.43)*	12.30 *(4.21)*	11.60 *(4.19)*	-0.68 *(4.77)*
	Perspective Taking	11.92 *(4.11)*	11.84 *(4.18)*	-0.14 *(3.96)*	11.24 *(3.26)*	11.40 *(3.89)*	0.12 *(4.06)*
	Catastrophizing	8.86 *(3.52)*	8.82 *(3.36)*	-0.68 *(3.95)*	9.22 *(3.40)*	8.59 *(3.68)*	-0.64 *(3.40)*
DECK	*Total stress exposure*	6.24 *(4.43)*	5.89 *(4.21)*	-0.35 *(2.10)*	4.42 *(3.10)*	4.40 *(2.60)*	0.17 *(2.27)*

*NOTE: a negative change score (Time 2 – Time 1) indicates greater scores at time 2 compared to time 1

Table 3.4 Means and Standard Deviations for Outcome Variables at Time 1 and Time 2 and Change Scores

		Experimental group (n=118) M *(SD)*			**Control Group (n=82) M *(SD)***		
		Time 1	*Time 2*	*Time 2 – Time 1*	*Time 1*	*Time 2*	*Time 2 – Time 1*
RCADS	*Anxiety*	10.70 *(6.90)*	9.01 *(5.79)*	-1.41 (*6.09)*	11.42 *(5.91)*	11.11 *(6.53)*	-0.56 *(4.74)*
	Depression	7.51 *(4.99)*	6.39 *(4.03)*	-0.79 *(3.95)*	7.45 *(4.28)*	6.95 *(4.65)*	-0.49 *(3.71)*
RCADS-P	*Anxiety*	2.89 *(3.24)*	2.40 *(2.65)*	-0.48 *(2.31)*	3.03 *(2.86)*	2.60 *(2.74)*	-0.24 *(1.66)*
	Depression	0.98 *(1.67)*	0.70 *(1.33)*	-0.28 *(1.41)*	0.38 *(0.83)*	0.26 *(0.74)*	-0.15 *(0.56)*
ACRS	*Closeness*	20.50 *(3.30)*	21.19 *(3.10)*	0.69 *(2.62)*	21.03 *(2.92)*	20.69 *(3.37)*	-0.29 *(2.71)*
	Conflict	30.96 *(10.01)*	30.50 *(9.98)*	-0.38 *(5.78)*	29.45 *(8.69)*	29.17 *(7.50)*	-0.17 *(4.05)*

*NOTE: a negative change score (Time 2 – Time 1) indicates greater scores at time 2 compared to time 1

Table 3.5 Correlations at Time 1 for Child Interview Continuous Variables

	1	2	3	4	5	6	7	8	9	10
1. RCADS: Anxiety										
2.RCADS: Depression	0.64***									
3.CERK-Q: Self-Blame	0.47***	0.34***								
4. CERK-Q: Other Blame	0.15*	0.23***	0.20**							
5 CERK-Q: Accept	0.21**	0.23***	0.45***	0.21**						
6. CERK-Q: Planning	-0.10	-0.17	-0.22**	-0.04	0.004					
7. CERK-Q: Positive Refocus	0.04	-0.03	-0.15*	-0.06	0.08	0.62***				
8. CERK-Q: Rumination	0.26***	0.11	0.13	-0.03	0.23***	0.38***	0.38***			
9. CERK-Q: Positive Reappraisal	0.002	-0.06	-0.17*	0.03	0.005	0.63***	0.53***	0.32***		
10. CERK-Q: Perspective Taking	0.15*	0.19**	0.15*	0.17*	0.20**	0.27***	0.12	0.31***	0.33***	
11. CERK-Q: Catastrophizing	0.38***	0.45***	0.51***	0.21**	0.39***	-0.06	-0.01	0.29***	-0.06	0.34***

*Correlation significant at the 0.05 level. **Correlation significant at the 0.01 level.
***Correlation significant at the 0.001 level.

Table 3.6 Correlations at Time 2 for Child Interview Continuous Variables

	1	2	3	4	5	6	7	8	9	10
1. RCADS: Anxiety										
2.RCADS: Depression	0.66***									
3.CERK-Q: Self-Blame	0.37***	0.37***								
4. CERK-Q: Other Blame	0.15*	0.30***	0.21**							
5 CERK-Q: .Accept	0.38***	0.42***	0.39***	0.25**						
6. CERK-Q: Planning	-0.05	-0.21**	-0.15*	-0.21**	0.01					
7. CERK-Q: Positive Refocus	-0.009	-0.19**	-0.20**	-0.23**	0.007	0.70***				
8. CERK-Q: Rumination	0.28***	0.25**	0.20**	-0.05	0.20***	0.39***	0.32***			
9. CERK-Q: Positive Reappraisal	0.0007	-0.16*	-0.13	-0.23**	-0.008	0.69***	0.62***	0.37***		
10. CERK-Q: Perspective Taking	0.14	0.02	0.18*	0.08	0.26**	0.35***	0.21**	0.33***	0.36***	
11. CERK-Q: Catastrophizing	0.35***	0.31***	0.51***	0.19**	0.41***	-0.11	-0.06	0.25***	-0.05	0.22***

*Correlation significant at the 0.05 level. **Correlation significant at the 0.01 level.
***Correlation significant at the 0.001 level.

Table 3.7 Correlations between Change Scores for Child Interview Continuous Variables

	1	2	3	4	5	6	7	8	9	10
1. RCADS: Anxiety T2-T1 change										
2.RCADS: Depression T2-T1 change	0.52***									
3.CERK-Q: Self-Blame T2-T1 change	0.26***	0.31***								
4. CERK-Q: Other Blame T2-T1 change	0.05	0.09	0.09							
5 CERK-Q: Accept T2-T1 change	0.26***	0.14	0.32***	0.09						
6. CERK-Q: Planning T2-T1 change	-0.03	-0.02	0.102	-0.04	-0.02					
7. CERK-Q: Positive Refocus T2-T1 change	0.08	-0.008	-0.03	-0.09	0.06	0.48***				
8. CERK-Q: Rumination T2-T1 change	0.24**	0.20*	0.24**	0.05	0.25***	0.32***	0.26***			
9. CERK-Q: Positive Reappraisal T2-T1 change	0.007	-0.07	0.03	-0.07	-0.05	0.50***	0.43***	0.21**		
10. CERK-Q: Perspective Taking T2-T1 change	0.10	0.02	0.09	0.21**	0.19*	0.37***	0.17*	0.20**	0.41***	
11. CERK-Q: Catastrophizing T2-T1 change	0.18*	0.25***	0.30***	-0.05	0.18*	-0.06	-0.06	0.18*	-0.02	0.16*

Note: change = Time 2 score – Time 1 score.
*Correlation significant at the 0.05 level. **Correlation significant at the 0.01 level.
***Correlation significant at the 0.001 level.

Table 3.8 Correlations at Time 1 for Parent Questionnaire Continuous Variables

	1	2	3	4	5	6
1. RCADS Parent Report: Anxiety						
2.RCADS: Parent Report Depression	0.475***					
3.Parent-Child Closeness	-0.167	-0.411***				
4.Parent-Child Conflict	0.253*	0.291**	-0.580***			
5.Prosocial Behavior	-0.176	-0.365***	0.524***	-0.582***		
6.Emotion Regulation	-0.304**	-0.422***	0.485***	-0.700***	0.738***	
7. DECK Total stress exposure	0.315**	0.342***	-0.146	0.310**	-0.212*	-0.274**

Note: change = Time 2 score – Time 1 score.
*Correlation significant at the 0.05 level. **Correlation significant at the 0.01 level.
***Correlation significant at the 0.001 level.

Table 3.9 Correlations at Time 2 for Parent Questionnaire Continuous Variables

	1	2	3	4	5	6
1. RCADS Parent Report Anxiety						
2.RCADS: Parent Report Depression	0.448***					
3.Parent-Child Closeness	-0.116	-0.357***				
4.Parent-Child Conflict	0.311**	0.370***	-0.446***			
5.Prosocial Behavior	-0.250*	-0.358***	0.573***	-0.519***		
6.Emotion Regulation	-0.479***	-0.346***	0.460***	-0.647***	0.691***	
7. DECK Total stress exposure	0.364***	0.423***	-0.200	0.401**	-0.201	-0.263*

Note: change = Time 2 score – Time 1 score.
*Correlation significant at the 0.05 level. **Correlation significant at the 0.01 level.
***Correlation significant at the 0.001 level.

Table 3.10 Correlations between Change Scores for Parent Questionnaire Continuous Variables

	1	2	3	4	5	6
1. RCADS Parent Report Anxiety T2-T1 change						
2.RCADS: Parent Report Depression T2-T1 change	0.281**					
3.Parent-Child Closeness T2-T1 change	-0.018	-0.267*				
4.Parent-Child Conflict T2-T1 change	0.234*	0.226*	-0.395***			
5.Prosocial Behavior T2-T1 change	-0.038	-0.178	0.420***	-0.255*		
6.Emotion Regulation T2-T1 change	-0.328**	-0.331**	0.287***	-0.252*	0.520***	
7. DECK Total stress exposure T2-T1 change	0.139	-0.117	0.056	0.124	0.04717	-0.073

Note: change = Time 2 score – Time 1 score.
*Correlation significant at the 0.05 level. **Correlation significant at the 0.01 level.
***Correlation significant at the 0.001 level.

Table 3.11 Association between Participating in the KEP Intervention and Changes in Child or Parent Reported Anxiety and Depression

	Child-reported Anxiety Change		**Parent-Reported Anxiety Change**		**Child-Reported Depression Change**		**Parent-Reported Depression Change**	
Model 1a	*b (SE)*	*T (df)*	*b (SE)*	*T (df)*	*b (SE)*	*T (df)*	*b (SE)*	*T (df)*
Intercept	4.12*** (0.93)	4.53 (199.37)	0.54 (0.30)	1.77 (82)	2.34*** (0.62)	3.77 (143.89)	0.22 (0.14)	1.57 (85)
Condition	-1.15 (0.78)	-1.48 (132.58)	0.28 (0.39)	0.71 (82)	-0.26 (0.54)	-0.49 (151.62)	-0.16 (0.20)	-0.78 (85)
Time one levels	-0.42*** (0.06)	-6.79 (113.43)	-0.35*** (0.06)	-5.69 (82)	-0.38*** (0.06)	-5.93 (121.98)	-0.51*** (0.07)	-7.31 (85)
Model 1b								
Intercept	2. 27 (1.24)	1.82 (152.27)	0.73* (0.33)	2.22 (81)	1.75* (0.79)	2.21 (175.09)	0.25 (0.14)	1.74 (84)
Condition	1.70 (1.54)	1.10 (145.87)	-0.29 (0.55)	-0.53 (81)	0.72 (1.06)	0.68 (156.99)	-0.26 (0.23)	-1.17 (84)
Time one levels	-0.25 (0.10)*	-2.52 (145.52)	-0.42*** (0.08)	-5.52 (81)	-0.30*** (0.09)	-3.28 (175.09)	-0.54*** (0.08)	-7.18 (84)
Time one levels X Condition	-0.26 (0.13)*	-2.03 (123.13)	0.19 (0.13)	1.48 (81)	-0.13 (0.13)	-1.03 (134.76)	0.21 (0.20)	1.06 (84)
Model 2a								
Intercept	4.12*** (0.93)	4.41 (117)	0.87* (0.35)	2.47 (82)	2.38*** (0.60)	3.97 (156.85)	0.19 (0.15)	1.27 (85)
Number of sessions	-0.10 (0.07)	-1.31 (134.32)	-0.04 (0.04)	-0.98 (82)	-0.03 (0.05)	-0.66 (167.81)	-0.01 (0.02)	-0.39 (85)
Time one levels	-0.42*** (0.06)	-6.81 (114.02)	-0.36*** (0.06)	-5.76 (82)	-0.38*** (0.06)	-5.95 (121.83)	-0.49*** (0.07)	-7.05 (85)
Model 2b								
Intercept	2.42* (1.21)	2.00 (131.61)	0.64 (0.42)	1.52 (81)	1.79* (0.76)	2.35 (170.3)	-0.03 (0.16)	-0.21 (84)
Number of Sessions	0.17 (0.14)	1.19 (149.13)	0.00 (0.06)	0.03 (81)	0.07 (0.10)	0.72 (159.24)	0.02 (0.02)	1.03 (84)
Time one levels	-0.27** (0.09)	-2.89 (133.26)	-0.28** (0.10)	-2.81 (81)	-0.30*** (0.09)	-3.34 (157.72)	-0.02 (0.16)	-0.15 (84)
Time one levels X Number of Sessions	-0.03* (0.01)	-2.13 (142.65)	-0.01 (0.01)	-1.06 (81)	-0.01 (0.01)	-1.19 (153.84)	-0.05** (0.02)	-3.32 (84)

Note: Anxiety and depression change are calculated as time 2 levels – time 2 levels.
$^{+}$ = trend level (less than or equal to 0.08), * p <0.05, ** p < 0.01, *** p < 0.001,

Table 3.12 Association between Participating in the KEP Intervention and Changes in Parent-Child Closeness and Conflict

	Parent-Child Closeness Change		Parent-Child Conflict Change	
	B (SE)	*T (df)*	*B (SE)*	*T (df)*
Model 1a				
Intercept	7.58 *** (1.74)	4.36 (86)	5.24** (1.86)	2.81 (85)
Time one levels	-0.34*** (0.08)	-4.04 (86)	-0.18** (0.06)	-3.23 (85)
Condition	-0.81 (0.53)	-1.53 (86)	-0.09 (1.07)	-0.08 (85)
Model 1b				
Intercept	8.33*** (2.13)	3.92 (85)	4.65* (2.22)	2.1 (84)
Time one levels	-0.37*** (0.10)	-3.64 (85)	-0.16* (0.07)	-2.38 (84)
Condition	-3.08 (3.72)	-0.83 (85)	1.69 (3.77)	0.45 (84)
Time one levels*Condition	0.11 (0.18)	0.61 (85)	-0.06 (0.12)	-0.49 (84)
Model 2a				
Intercept	6.40*** (1.77)	3.63 (86)	5.50** (1.82)	3.01 (85)
Time one levels	-0.33*** (0.08)	-4 (86)	-0.18** (0.06)	-3.17 (85)
Number of sessions	0.13* (0.05)	2.34 (86)	-0.08 (0.11)	-0.69 (85)
Model 1b				
Intercept	2.53* (2.66)	0.95 (85)	5.49* (2.76)	1.99 (84)
Time one levels	-0.14* (0.13)	-1.13 (85)	-0.18* (0.09)	-1.95 (84)
Number of sessions	0.81* (0.36)	2.25 (85)	-0.07 (0.38)	-0.2 (84)
Time one levels* Number of sessions	-0.03^{+} (0.02)	-1.92 (85)	-0.00 (0.01)	0 (84)

Note: parent-child closeness and conflict change are calculated as time 2 levels – time 2 levels.

$^{+}$ = trend level (less than or equal to 0.08), * p <0.05, ** p < 0.01, *** p < 0.001

Figure 3.3 Association between Treatment Engagement and Changes in Parent Reported Parent-Child Closeness and Conflict

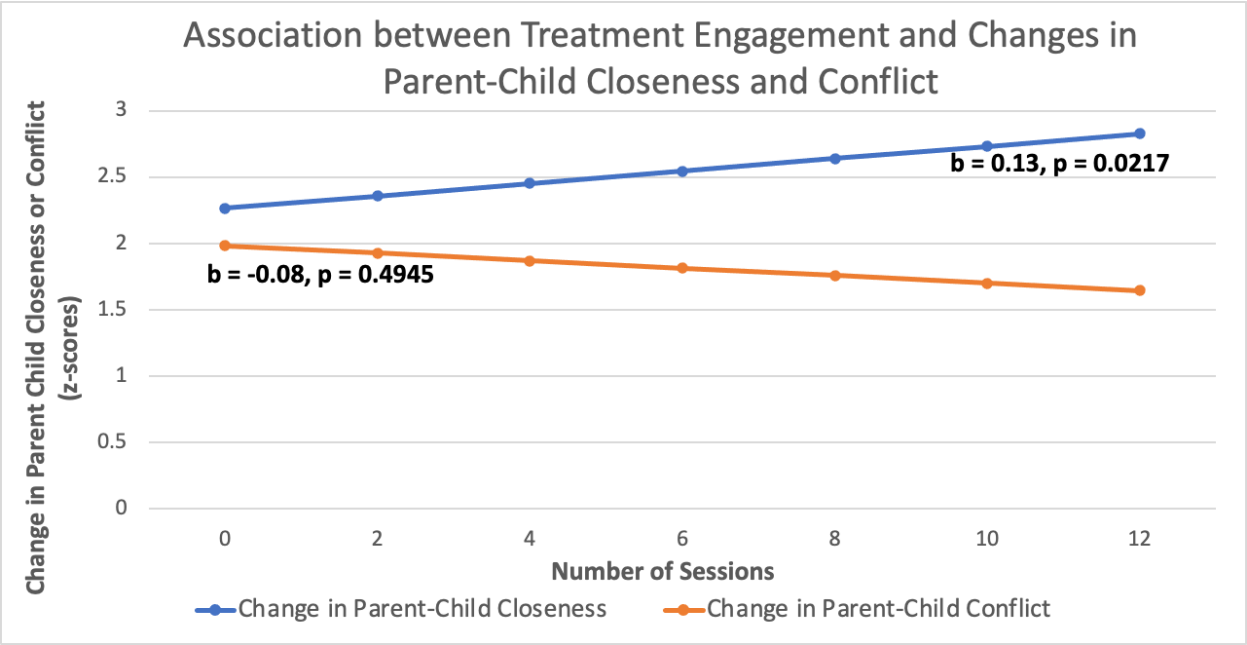


Table 3.13 Association between Changes in Parent-Child Closeness and Conflict and Changes in Parent-Reported Depression and Anxiety

	Parent Reported Anxiety Change		Parent Reported Depression Change	
Model 1	*b (SE)*	*T (df)*	*b (SE)*	*SE (df)*
Intercept	-0.66 (1.50)	-0.44 (81)		
Change in Parent-Child Closeness	0.01 (0.08)	0.18 (81)		
Time one levels (anxiety or depression)	-0.34*** (0.06)	-5.34 (81)		
Time one parent-child closeness	0.06 (0.07)	0.89 (81)		
Model 2a				
Intercept			1.56* (0.77)	2.03 (84)
Change in Parent-Child Closeness			-0.09* (0.04)	-2.39 (84)
Time one levels (anxiety or depression)			-0.53*** (0.07)	-7.21 (84)
Time one parent-child closeness			-0.07^{+} (0.04)	-1.85 (84)
Model 3				
Intercept	0.06 (0.68)	0.09 (80)		
Change in Parent-Child Conflict	0.10** (0.04)	2.65 (80)		
Time one levels (anxiety or depression)	-0.37*** (0.06)	-5.81 (80)		
Time one Parent-Child Conflict	0.02 (0.02)	0.93 (80)		
Model 4				
Intercept			-0.58 (0.34)	-1.73 (83)
Change in Parent-Child Conflict			0.05* (0.02)	2.63 (83)
Time one levels (anxiety or depression)			-0.53** (0.07)	-7.64 (83)
Time one Parent-Child Conflict			0.03* (0.01)	2.32 (83)

Note: parent-child closeness and conflict change and anxiety and depression change are calculated as time 2 levels – time 2 levels.

$^{+}$ = trend level (less than or equal to 0.08), * p <0.05, ** p < 0.01, *** p < 0.001

Figure 3.4 Association between Changes in Parent-Child Closeness and Changes in Parent Reported Symptoms of Anxiety and Depression

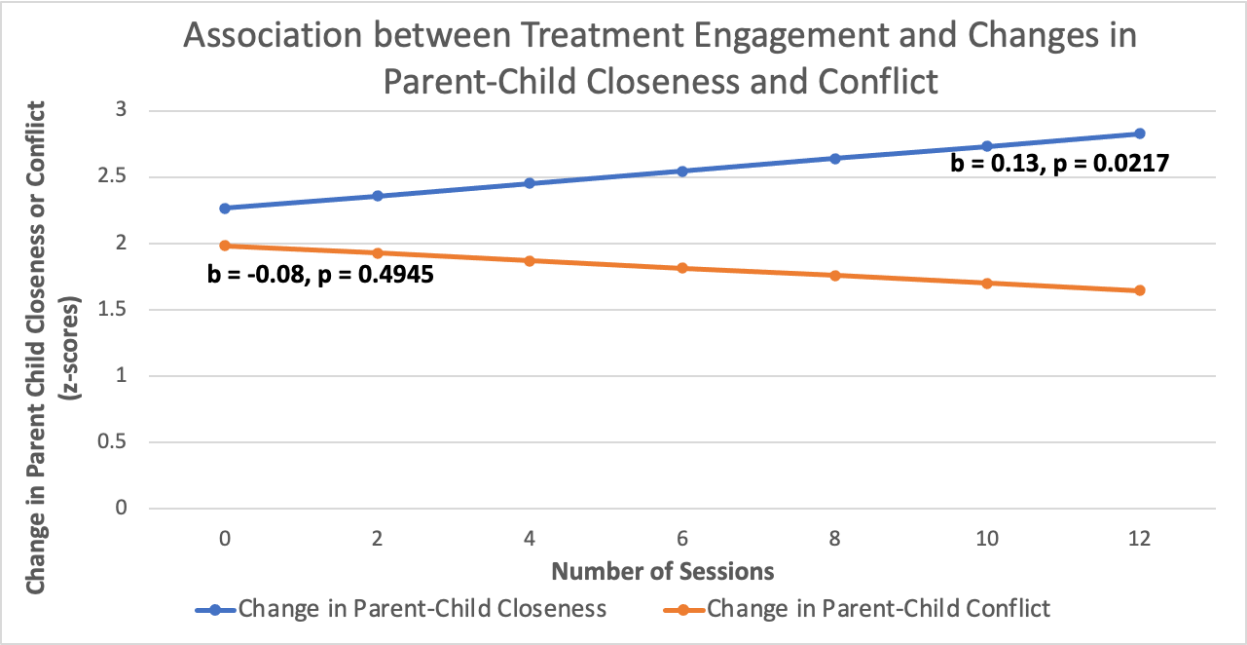


Figure 3.5 Association between Changes in Parent-Child Conflict and Changes in Parent Reported Symptoms of Anxiety and Depression

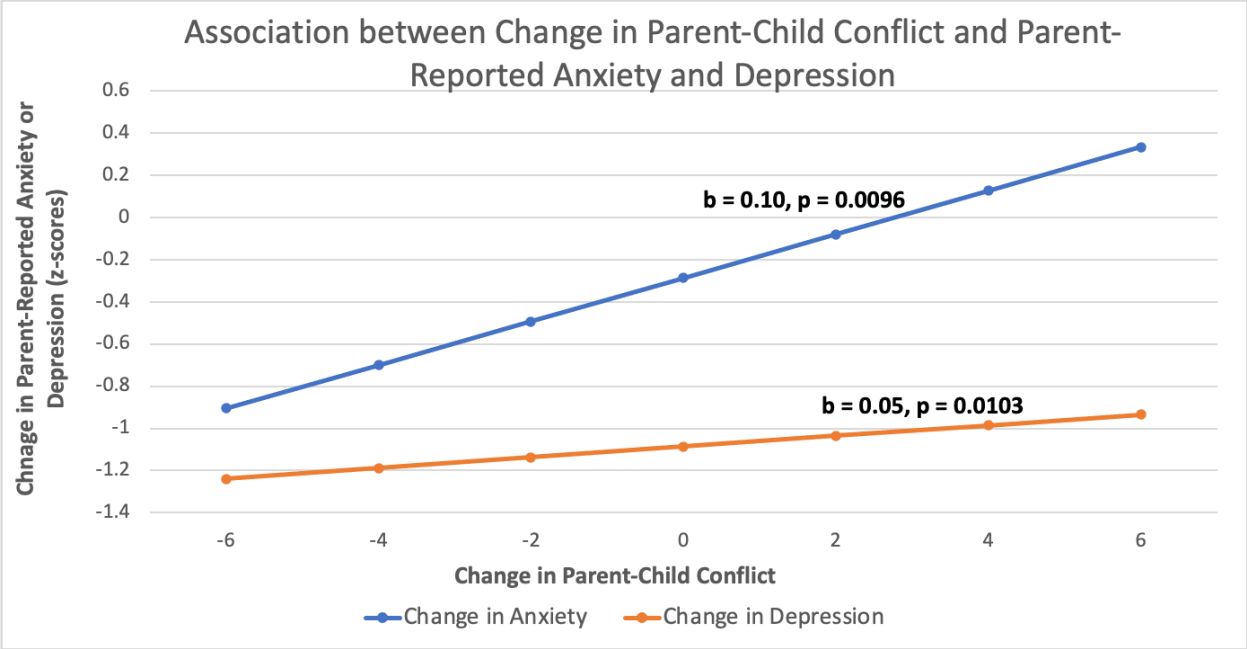


Table 3.14 Association between Participating in the KEP Intervention and Changes in Parent Reported Prosocial Behaviors or Emotion Regulation

	Prosocial Behavior Change		**Emotion Regulation Change**	
	b(SE)	*t(df)*	*b(SE)*	*t(df)*
Model 1a				
Intercept	6.86*** (1.21)	5.66 (86)	5.94*** (1.35)	4.41 (85)
Time one levels	-0.26*** (0.06)	-4.50 (86)	-0.27*** (0.08)	-3.47 (85)
Condition	-0.53 (0.59)	-0.91 (86)	-1.20^{+} (0.63)	-1.88 (85)
Model 1b				
Intercept	7.99*** (1.52)	5.24 (86)	6.62*** (1.74)	3.81 (84)
Time one levels	-0.32*** (0.08)	-4.27 (86)	-0.31** (0.10)	-3.04 (84)
Condition	-3.41 (2.43)	-1.40 (86)	-2.84 (2.73)	-1.04 (84)
Time one levels* Condition	0.15 (0.12)	1.22 (86)	0.10 (0.16)	0.62 (84)
Model 2a				
Intercept	6.27*** (1.22)	5.13 (86)	4.24** (1.37)	3.11 (85)
Time one levels	-0.27*** (0.06)	-4.56 (86)	-0.26*** (0.08)	-3.43 (85)
Number of sessions	0.08 (0.06)	1.33 (86)	0.19** (0.06)	3.04 (85)
Model 1b				
Intercept	4.37* (1.72)	2.54 (86)	3.22 (1.92)	1.68 (84)
Time one levels	-0.17* (0.09)	-2.00 (86)	-0.20 (0.11)$^{+}$	-1.81 (84)
Number of sessions	0.46^{+} (0.25)	1.83 (86)	0.39 (0.27)	1.44 (84)
Time one levels* Number of sessions	-0.02 (0.01)	-1.56 (86)	-0.01 (0.02)	-0.75 (84)

Note: Prosocial behavior and Emotion Regulation change are calculated as time 2 levels – time 2 levels.

$^{+}$ = trend level (less than or equal to 0.08), * p <0.05, ** p < 0.01, *** p < 0.001

Table 3.15 Association between Participating in the KEP Intervention and Changes in Child Reported Emotion Regulation Strategies

	CERQ-K Subscales					
	Self-Blame		Other-Blame		Acceptance	
	b(SE)	*t(df)*	*b(SE)*	*t(df)*	*b(SE)*	*t(df)*
Model 1a						
Intercept	3.93*** (0.64)	6.13 (154.57)	3.61*** (0.40)	9.11 (173.06)	4.66*** (0.58)	7.98 (165.84)
Condition	-0.05 (0.44)	-0.12 (149.69)	0.19 (0.33)	0.58 (151.51)	0.03 (0.42)	0.08 (157.13)
Time one levels	-0.55*** (0.07)	-7.80 (144.53)	-0.69*** (0.05)	-13.11 (173.51)	-0.69*** (0.06)	-10.64 (158.4)
Model 1b						
Intercept	3.11*** (0.81)	3.83 (178.99)	3.06*** (0.52)	5.90 (176.82)	3.97*** (0.84)	4.74 (153.54)
Condition	1.47 (1.16)	1.27 (143.45)	1.20 (0.73)	1.66 (160)	1.21 (1.07)	1.13 (157.71)
Time one levels	-0.44*** (0.09)	-4.68 (177.4)	-0.59*** (0.08)	-7.77 (179.9)	-0.60*** (0.10)	-5.88 (144.4)
Time one Levels* Condition	-0.20 (0.14)	-1.42 (143.39)	-0.17 (0.10)	-1.60 (172.18)	-0.16 (0.13)	-1.18 (153.33)
Model 2a						
Intercept	3.89*** (0.65)	6.01 (141.12)	3.64*** (0.41)	8.95 (155.86)	4.90*** (0.59)	8.34 (154.65)
Number of sessions	0.001 (0.04)	0.01 (155.61)	0.01 (0.03)	0.40 (161.56)	-0.03 (0.4)	-0.85 (158.31)
Time one levels	-5.44*** (0.07)	-7.76 (143.13)	-0.69*** (0.05)	-13.11 (174.11)	-0.70*** (0.06)	-10.70 (157.73)
Model 2b						
Intercept	3.38*** (0.81)	4.16 (147.88)	3.37*** (0.50)	6.69 (170.09)	4.40*** (0.82)	5.39 (143.15)
Number of sessions	0.10 (0.10)	0.95 (155.41)	0.07 (0.07)	0.96 (171.79)	0.05 (0.11)	0.52 (146.19)
Time one levels	-0.48*** (0.10)	-5.14 (153.9)	-0.64*** (0.07)	-8.76 (178.79)	-0.63*** (0.10)	-6.40 (141.75)
Time one levels* Number of sessions	-0.01 (0.01)	-1.02 (155.35)	-0.01 (0.01)	-0.87 (170.99)	-0.01 (0.01)	-0.92 (151.07)

Note: Change for each subscale was calculated as time 2 levels – time 2 levels.
$^{+}$ = trend level (less than or equal to 0.08), * p <0.05, ** p < 0.01, *** p < 0.001

Table 3.16 Association between Participating in the KEP Intervention and Changes in Child Reported Emotion Regulation Strategies

	CERQ-K Subscales					
	Planning		Positive Refocus		Rumination	
	b(SE)	*t(df)*	*b(SE)*	*t(df)*	*b(SE)*	*t(df)*
Model 1a						
Intercept	5.95*** (1.04)	5.72 (145.82)	5.77*** (1.08)	5.36 (145.99)	7.93*** (0.94)	8.48 (160.16)
Condition	0.06 (0.55)	0.11 (157.43)	0.15 (0.65)	0.23 (144.76)	-0.21 (0.56)	-0.38 (156.11)
Time one levels	-0.48*** (0.07)	-6.73 (143.66)	-0.46*** (0.07)	-6.60 (143.47)	-0.70*** (0.07)	-10.01 (157.62)
Model 1b						
Intercept	5.83*** (1.47)	3.97 (173.28)	4.09** (1.65)	2.98 (142.22)	7.09*** (1.30)	5.43 (175.6)
Condition	0.25 (1.98)	0.13 (157.55)	1.51 (2.10)	0.72 (133.02)	1.30 (1.75)	0.74 (162.33)
Time one levels	-0.47*** (0.11)	-4.45 (173.59)	-0.40*** (0.11)	-3.50 (150.34)	-0.62*** (0.10)	-6.12 (177.69)
Time one levels*Condition	-0.01 (0.14)	-0.10 (158.56)	-0.10 (0.15)	-0.68 (134.78)	-0.13 (0.14)	-0.92 (168.46)
Model 2a						
Intercept	5.73*** (1.04)	5.53 (142.55)	5.70*** (1.07)	5.34 (139.09)	7.66*** (0.94)	8.15 (154.65)
Number of sessions	0.05 (0.05)	0.92 (169.55)	0.03 (0.06)	0.46 (158.8)	0.02 (0.05)	0.39 (145.57)
Time one levels	-0.48*** (0.07)	-6.77 (143.86)	-0.46*** (0.07)	-6.61 (145.55)	-0.69*** (0.07)	-9.99 (157.93)
Model 2b						
Intercept	5.14*** (1.43)	3.59 (151.83)	4.75** (1.56)	3.04 (133.65)	6.82*** (1.29)	5.28 (161.84)
Number of sessions	0.15 (0.19)	0.82 (160.98)	0.19 (0.19)	0.95 (145.51)	0.17 (0.17)	1.00 (158.12)
Time one levels	-0.44*** (0.10)	-4.26 (155.5)	-0.39*** (0.12)	-3.64 (142.53)	-0.62*** (0.01)	-6.18 (169.74)
Time one levels*Number of sessions	-0.01 (0.01)	-0.59 (158.24)	-0.01 (0.01)	-0.86 (145.16)	-0.01 (0.01)	-0.94 (168.29)

Note: Change for each subscale was calculated as time 2 levels – time 2 levels.
$^{+}$ = trend level (less than or equal to 0.08), * p <0.05, ** p < 0.01, *** p < 0.001

Table 3.17 Association between Participating in the KEP Intervention and Changes in Child Reported Emotion Regulation Strategies

	CERQ-K Subscales					
	Catastrophizing		Positive Reappraisal		Perspective Taking	
	b(SE)	*T(df)*	*b(SE)*	*T(df)*	*b(SE)*	*T (df)*
Model 1a						
Intercept	4.54*** (0.76)	5.98 (143.29)	6.08*** (1.07)	5.68 (150.3)	5.43*** (0.89)	6.11 (167.03)
Condition	-0.22 (0.49)	-0.45 (154.16)	0.83 (0.62)	1.34 (156.43)	0.05 (0.56)	0.09 (142.48)
Time one levels	-0.55*** (0.07)	-7.65 (133.74)	-0.55*** (0.08)	-7.04 (148.16)	-0.47*** (0.07)	-6.60 (159.72)
Model 1b						
Intercept	3.09** (1.10)	2.80 (144.32)	7.24*** (1.42)	5.10 (172.45)	6.28*** (1.46)	4.31 (173.23)
Condition	2.14 (1.37)	1.57 (157.41)	-1.29 (1.96)	-0.66 (152.59)	-1.22 (1.81)	-0-.67 (168.45)
Time one levels	-0.40*** (0.11)	-3.46 (134.08)	-0.64*** (0.11)	-5.89 (171.76)	-0.55*** (0.13)	-4.35 (169.24)
Time one levels* Condition	-0.26^{+} (0.14)	-1.82 (150.54)	0.18 (0.15)	1.14 (153.94)	0.11 (0.15)	0.73 (169.72)
Model 2a						
Intercept	4.45*** (0.74)	6.01 (149.65)	5.86*** (1.07)	5.49 (134.54)	5.22*** (0.88)	5.92 (165.02)
Number of Sessions	-0.01 (0.05)	-0.18 (156.05)	0.13* (0.06)	2.18 (161.42)	0.05 (0.05)	1.05 (163.49)
Time one levels	-0.55*** (0.07)	-7.66 (135.1)	-0.55*** (0.08)	-7.11 (146.4)	-0.48*** (0.07)	-6.71 (159.6)
Model 2b						
Intercept	3.08** (1.09)	2.83 (129.63)	6.52 (1.39)***	4.70 (153.01)	6.16*** (1.38)	4.45 (155.8)
Number of Sessions	0.22 (0.13)	1.64 (146.31)	0.001 (0.18)	0.01 (170.65)	-0.09 (0.17)	-0.54 (161.2)
Time one levels	-0.40*** (0.11)	-3.54 (116.47)	-0.60*** (0.11)	-5.67 (159.99)	-0.56*** (0.12)	-4.70 (149.05)
Time one Levels* Number of Sessions	-0.02^{+} (0.01)	-1.80 (137.58)	0.01 (0.01)	0.73 (165.8)	0.01 (0.01)	0.90 (158.26)

Note: Change for each subscale was calculated as time 2 levels – time 2 levels.
$^{+}$ = trend level (less than or equal to 0.08), * p <0.05, ** p < 0.01, *** p < 0.001

Figure 3.6 Association between Changes in Parent Reported Prosocial Behaviors and Changes in Parent-Child Conflict and Closeness

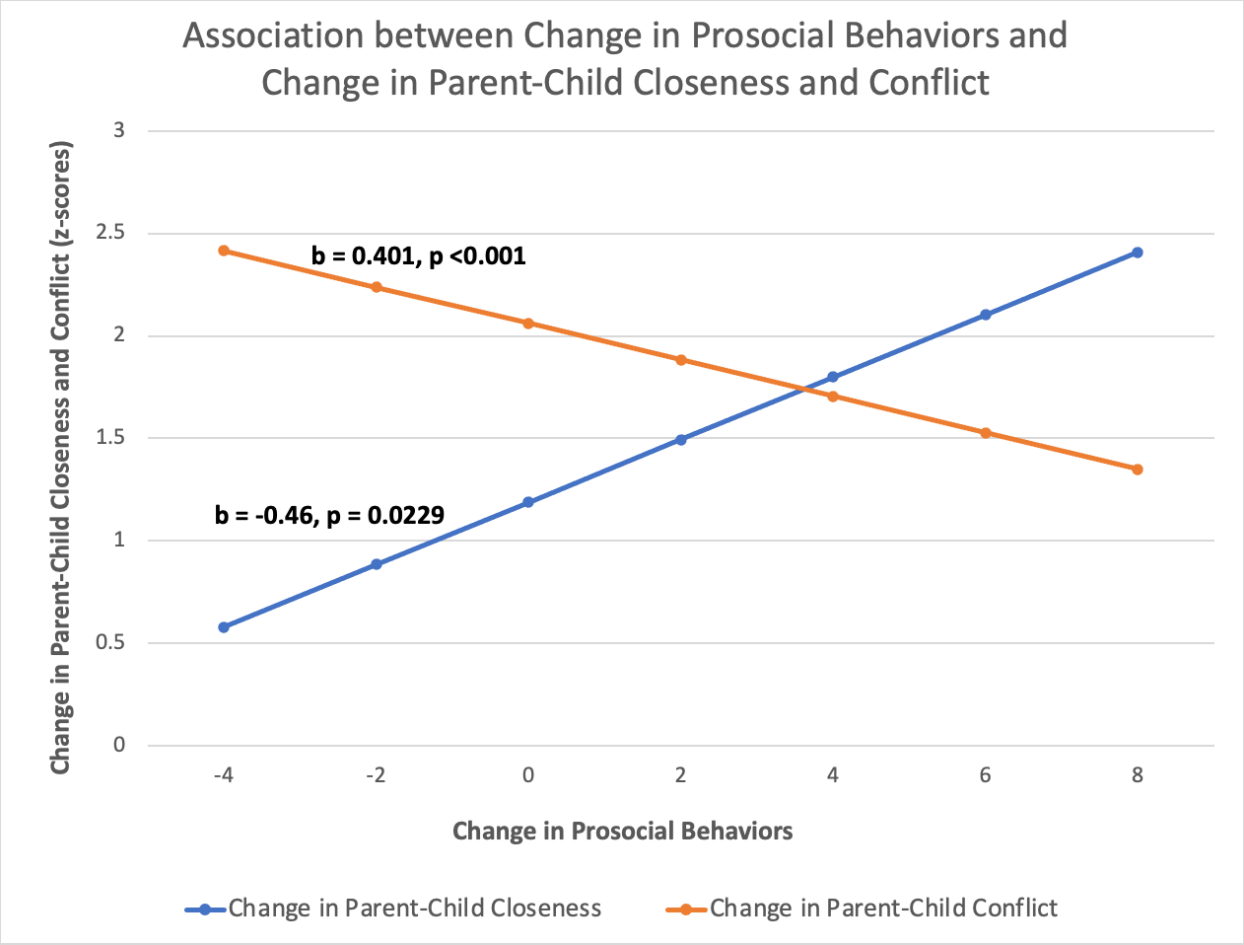


Figure 3.7 Association between Changes in Parent Reported Emotion Regulation and Changes in Parent-Reported Anxiety and Depression

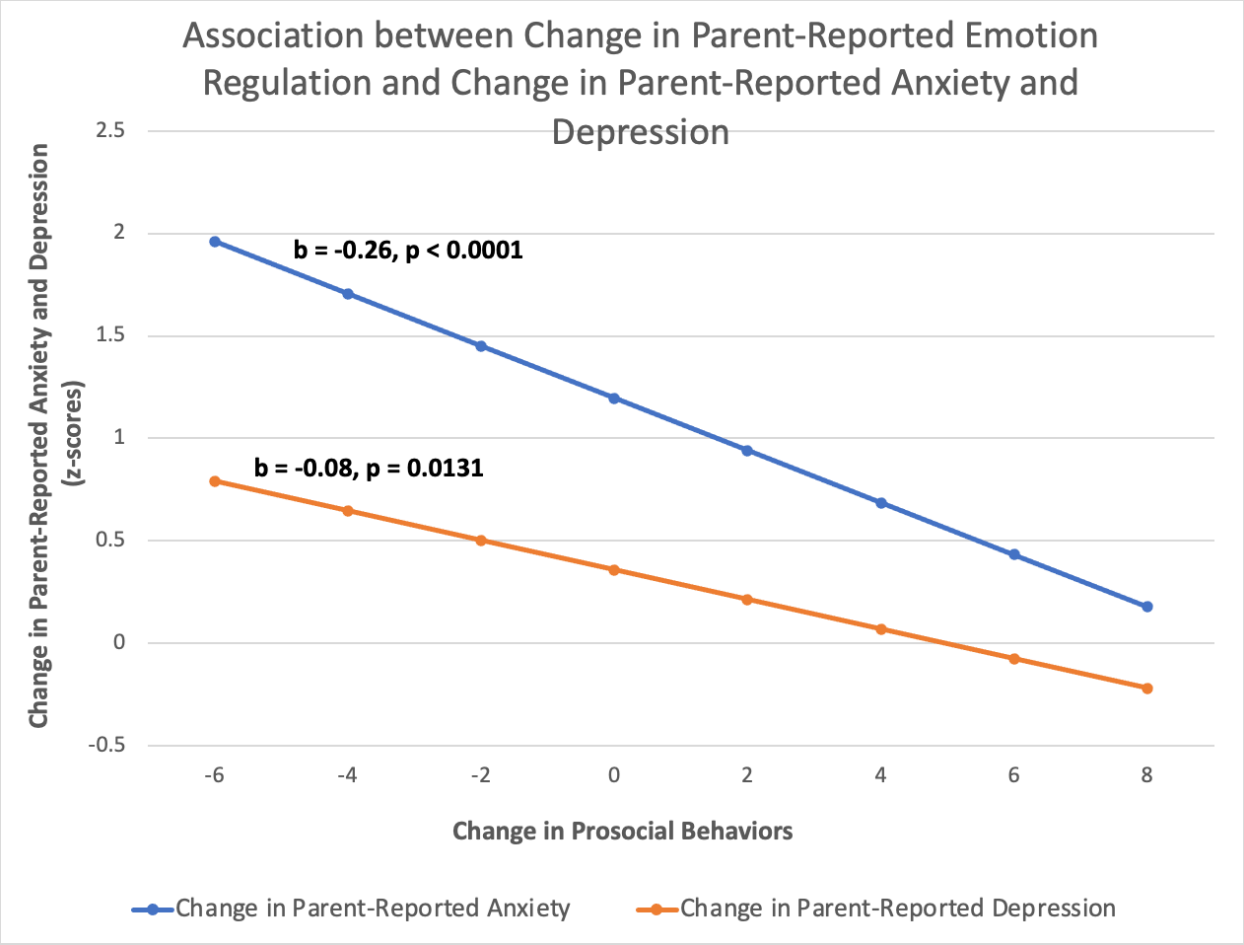


Figure 3.8 Association between Changes in Parent Reported Emotion Regulation and Changes in Parent-Child Conflict and Closeness

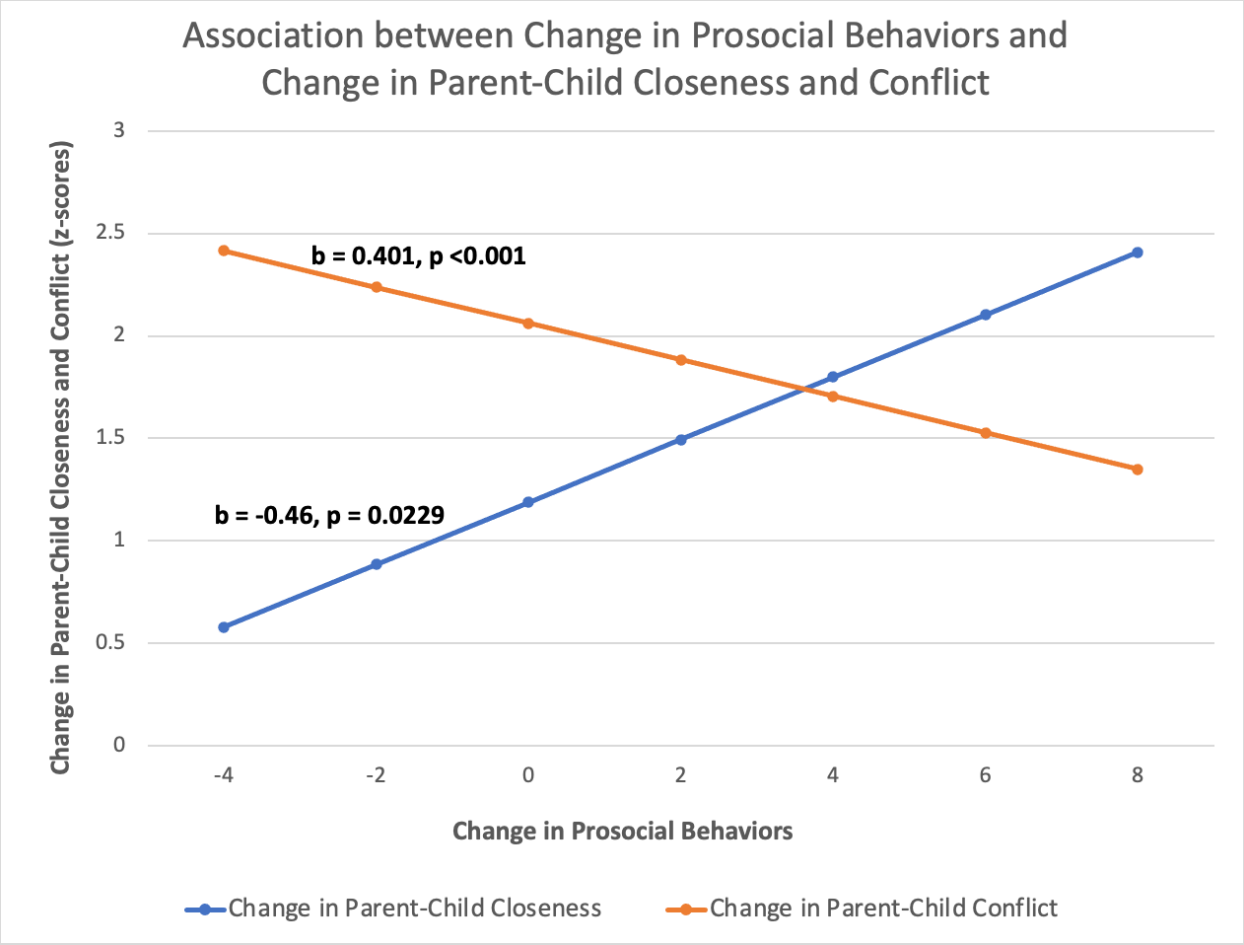


Table 3.18 Association between Participating in the KEP Intervention and Changes in Child Reported Emotion Regulation Strategies

	b	**SE**	**Z Score**	***p* value**
Total Effect	0.1404	0.0501	2.81	0.005**
Controlled Direct Effect	0.1127	0.0520	2.17	0.0301*
Natural Direct Effect	0.1108	0.0521	2.12	0.0336*
Natural Indirect Effect	0.0301	0.0120	1.52	0.1296
Percentage Mediated	21.3397	15.3556	1.39	0.1646
Percentage due to Interaction	1.3960	4.3921	0.32	0.7506
Percentage Eliminated	19.9437	15.7324	1.27	0.2049

Table 3.19 Impact of Stress Exposure on the Association between Participating in the KEP Intervention and Changes in Parent Reported Prosocial Behaviors and Emotion Regulation

	Prosocial Behaviors Change		**Emotion Regulation Change**	
	b(SE)	*t(df)*	*b(SE)*	*t(df)*
Model 1a				
Intercept	6.19*** (1.38)	4.49 (85)	4.86*** (1.59)	3.05 (84)
DECK	0.02 (0.08)	0.23 (85)	-0.01 (0.09)	-0.16 (84)
Time one levels	-0.26** (0.06)	-4.32 (85)	-0.27*** (0.08)	-3.37 (84)
Condition	0.5 (0.61)	0.82 (85)	1.22 (0.66)	1.85 (84)
Model 1b				
Intercept	6.29* (1.58)	3.99 (84)	4.51*** (1.79)	2.52 (83)
DECK	0 (0.17)	-0.02 (84)	0.06 (0.19)	0.31 (83)
Time one levels	-0.26** (0.06)	-4.3 (84)	-0.27*** (0.08)	-3.31 (83)
Condition	0.38 (1.08)	0.35 (84)	1.63 (1.17)	1.4 (83)
DECK*Condition	0.03 (0.19)	0.13 (84)	-0.09 (0.21)	-0.43 (83)
Model 2a				
Intercept	6.14** (1.37)	4.48 (85)	4.37*** (1.56)	2.81 (84)
DECK	0.02 (0.08)	0.21 (85)	-0.01 (0.08)	-0.17 (84)
Time one levels	-0.26** (0.06)	-4.39 (85)	-0.26*** (0.08)	-3.34 (84)
Number of sessions	0.08** (0.06)	1.26 (85)	0.19 (0.06)	3.01 (84)
Model 2b				
Intercept	6.11 (1.53)	4 (84)	4.65*** (1.67)	2.78 (83)
DECK	0.02 (0.14)	0.16 (84)	-0.07 (0.14)	-0.49 (83)
Time one levels	-0.26** (0.06)	-4.32 (84)	-0.27*** (0.08)	-3.34 (83)
Number of sessions	0.08 (0.11)	0.76 (84)	0.15 (0.11)	1.33 (83)
DECK*Number of sessions	0 (0.02)	-0.05 (84)	0.01 (0.02)	0.48 (83)

Note: Change for each subscale was calculated as time 2 levels – time 2 levels.
$^{+}$ = trend level (less than or equal to 0.08), * p <0.05, ** p < 0.01, *** p < 0.001

Chapter 4 The Impact of the Mood Lifters™ Intervention on Social Support, Coping skills and Psychological Well-being and the Role of Life Events

Chronic and early life stress exposure have been linked with negative health outcomes in adults. Stress exposure is associated with the onset of stress-related conditions such as anxiety (Hovens et al., 2010), depression (Tennant, 2002), cardiovascular disease (Cho, 2013), immune dysregulation (Fagundes, Glaser, & Kiecolt-Glaser, 2013), obesity (Brunner, Chandola, & Marmot, 2007) and reduced longevity (Epel & Lithgow, 2014). While the vast majority of adults are exposed to at least some stress, only about 50% will experience mental illness during their lifetime (Kessler et al., 1994, 2010). Therefore, around half of adults show resilience, known as the ability to cope with or bounce back from the effects of stress (Carver, 1998; Kalisch, Müller, & Tüscher, 2015).

A number of factors have been associated with resilience in adults facing adversity, including social support (Sheikh, Abelsen, & Olsen, 2016) and coping skills (Mahmoud, Staten, Hall, & Lennie, 2012). Preventative interventions that seek to improve these resilience factors may lead to reductions in the negative effects of stress on health. Study three of this dissertation sought to examine whether participation in Mood Lifters™, a novel skills-based group intervention, influences self-reported social support and coping skills. This study also investigated whether changes in resilience factors provide a mechanism by which participation in the Mood Lifters™ intervention influences symptoms of anxiety, depression, and perceived stress. Finally, this study examined whether the experience of childhood trauma, recent life events, or daily hassles moderated the association between participating in the intervention and

changes in social support, coping skills, perceived stress, anxiety, and depression. This research may help provide evidence for whether Mood Lifters™ , a low-cost, peer-led group intervention, bolsters resilience among adults.

The Link Between Stress and Health

Stress exposure, including the experience of early life trauma, traumatic or negative life events, and daily hassles, is a risk factor for negative mental and physical health outcomes in adults (Brunner et al., 2007; Cho, 2013; Fagundes et al., 2013; Tennant, 2002). Early life trauma refers to negative and traumatic events occurring in childhood and represents a significant risk to well-being. In fact, adverse experiences in childhood account for 44% of childhood-onset mental health conditions and 20% of adult-onset mental health disorders (Kessler et al., 2010). For example, the Adverse Childhood Experience Study (ACES) examined childhood exposure to experiences such as psychological, physical and sexual abuse, violence against their mother, and living with individuals who abused substances, or were mentally ill or suicidal or were ever imprisoned (Felitti et al., 1998, 2019). The researchers found that more than half of the adults surveyed had experienced at least one category of childhood adversity. Individuals who had experienced four or more categories reported 4- to 12-fold increased risk for alcohol and drug abuse, depression, and suicide attempts (Felitti et al., 1998, 2019).

Exposure to more recent major life events, such as financial or housing problems, legal problems, loss of important social relationships, has also been shown to be a strong risk factor for major depressive and anxiety disorders in adults (Kendler et al., 2010; Kendler, Hettema, Butera, Gardner, & Prescott, 2003; Kendler, Kuhn, & Prescott, 2004). Likewise, exposure to daily hassles, defined as small frustrations and irritants that occur as the result of one's interaction with their environment (Kanner, Coyne, Schaefer, & Lazarus, 1981), can also lead to

negative health outcomes (Falconier, Nussbeck, Bodenmann, Schneider, & Bradbury, 2015; Tajalli, sobhi, & Ganbaripanah, 2010). Assessing daily hassles has become important in resilience research due to the increased frequency of these events compared to major negative life events and the ability to distinguish between the frequency of hassles and the perceived intensity of each hassle (Falconier et al., 2015; Serido, Almeida, & Wethington, 2004).

Factors Associated with Resilience

A number of studies suggest that individual factors such as social support and coping skills may increase one's ability to cope with stressors (Bonanno, Romero, & Klein, 2015; Feder, Nestler, & Charney, 2009; Gaffey, Bergeman, Clark, & Wirth, 2016; Simeon et al., 2007). Therefore, these factors may be associated with reduced risk for negative outcomes when individuals are exposed to stress. While many factors have been associated with resilience in adults, this study focuses on the impact of social support and coping skills.

Social support refers to the different types of assistance or help that individuals receive from other people (Cohen, 2004). While social support can come in many forms, researchers have identified two main categories: instrumental support and emotional support. Instrumental support refers to information or tangible acts offered by others, such as making meals, picking up groceries, or providing transportation to appointments. In contrast, emotional support consists of behaviors that bolster one's self-worth or make them feel loved (Cohen, 2004), such as talking and spending time together. Social support may be particularly important for quality of life and well-being for older adults (Gaffey et al., 2016). Among older adults, higher levels of emotional support are associated with reduced risk of early mortality (Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015), improved emotional well-being (Bisconti, Bergeman, & Boker, 2006), and better quality of life even in the context of chronic pain (Jakobsson & Hallberg, 2002). In

contrast, loneliness and social isolation are strongly linked with lower social resources and poorer psychological health (Hawkley & Cacioppo, 2010).

Social support also appears to foster resilience among individuals exposed to early life adversity and recent negative life events. Among adults who had experienced childhood adversity, instrumental social support was the most significant predictor of mental health outcomes, and emotional social support explained most of the variance in well-being (Sheikh et al., 2016). A study of the impact of social support on mental health after experiencing a major life event (i.e., bereavement, marital separation, poverty) found that high pre-stress exposure social support increased the likelihood of resilience by 40-60% compared to individuals reporting low pre-stress social support (Netuveli, Wiggins, Montgomery, Hildon, & Blane, 2008). Another study demonstrated an association between higher levels of social support and resilience among Chinese medical students exposed to recent negative life events (Peng et al., 2012). Therefore, individuals who report high levels of social support may show reduced rates of negative outcomes when exposed to childhood adversity and recent stress.

In addition to social support, the use of effective coping skills has been associated with resilience to adversity. Coping skills refer to cognitive and behavioral efforts people use to tolerate, escape, or minimize the effects of stress (Lazarus & Folkman, 1984). The use of adaptive coping skills is more likely to result in a resolution to the stressful situation and less likely to lead to negative mental health outcomes (Amnie, 2018; Gloria & Steinhardt, 2016; Kinderman, Schwannauer, Pontin, & Tai, 2013; Mahmoud et al., 2012). Research suggests that adaptive coping skills involve coping with stressful situations by identifying the situation, actively seeking support, reflecting on possible solutions, and taking action to solve the problem. Examples of adaptive coping strategies include active coping, planning, and positive reframing

(Brown, Westbrook, & Challagalla, 2005). In contrast, maladaptive coping skills involve withdrawing from the stressful situation and avoiding seeking solutions (Lazarus & Folkman, 1984; Mahmoud et al., 2012). Denial, venting, and substance use are some examples of maladaptive coping strategies. However, rather than being universally adaptive or maladaptive, the efficacy of coping skills may depend on the context and the nature and intensity of the stressor (Lazarus & Folkman, 1984). For example, a number of studies differentiate between problem-focused coping and emotion-focused coping (Compas, Orosan, & Grant, 1993). Problem focused coping refers to attempts to act on a stressor, whereas emotion-focused coping entails attempts to manage one's emotions associated with a stressor. Individuals may rely on emotion-coping strategies when feeling overwhelmed and when the stressor is perceived as outside the individual's control (Carver, Scheier, & Weintraub, 1989; Steinhardt & Dolbier, 2008). When stressors are within one's control, however, the use of problem-focused coping skills may be more effective. Therefore, the context represents an important consideration when evaluating the effectiveness of coping strategies. Studies of resilience should consider the impact of various types of coping skills on coping with distinct stressors, including childhood adversity, recent life events, and daily hassles.

Mood Lifters™

Skills-based preventative interventions have been shown to increase perceived social support and problem-focused coping and teach individuals how to determine which coping strategy may be most effective for the situation (Steinhardt & Dolbier, 2008). Although such interventions may be effective for fostering resilience, access and barriers to effective care are a significant concern. Research suggests that the current mental health care system in the United States is not meeting demands for services, with only 43.1% of the 44.7 million Americans

affected by mental illness receiving mental health care in the last year (Stein, Celedonia, Kogan, Swartz, & Frank, 2013). Even when individuals are referred for mental health care treatment, they often are unable to find treatment providers or drop out of treatment prematurely (Olfson, Wang, Wall, Marcus, & Blanco, 2019). Further, even when individuals find, stay in and receive care, the majority do not receive evidence-based or guideline-concordant care (Rapp et al., 2010). Therefore, the is a clear need for improvements in treatment accessibility.

In response to the significant barriers to evidenced-based treatment, Dr. Patricia Deldin developed Mood Lifters™ (Votta, Belpedio, Roberts, Porte, & Deldin, n.d.). This intervention was designed to provide a low-cost, research-based, supportive group program to enrich participants' lives and reduce psychological distress. Using a biopsychosocial, RDOC approach, weekly Mood Lifters™ sessions integrate techniques and teach skills from evidence-based treatments such as Cognitive-Behavioral Therapy, Interpersonal Therapy, Acceptance and Commitment Therapy, Mindfulness, and Dialectical Behavior Therapy. Data from a small pilot study suggests that participants who completed Mood Lifters™ reported 50% decreases in internalizing symptoms and increases in physical activity to 170% of that reported that baseline (Votta et al., n.d.). During each weekly session, participants in Mood Lifters™ learn a new skill related to mental health and overall well-being (e.g., paying attention to and regulating thoughts and emotions, social skills, etc.). Each week, participants have a goal to get a certain number of points by engaging in that skill. For instance, after the behavioral activation sessions participants attempt to engage in 5 behaviors that get them a sense of pleasure, mastery, or accomplishment before the next weekly session. During the check-in at that session, participants are awarded points for every behavior they tracked during the week. Initial findings from this RCT suggest that participants who obtain more points over the course of the program show greater reductions

in anxiety symptoms compared to participants who get fewer points (Votta et al., n.d.). Assessing the number of points participants gain over the program may provide a metric for treatment engagement and allow for better investigation of the mechanisms underlying the positive response to the Mood Lifters™ intervention.

While preliminary data suggest that Mood Lifters™ intervention is effective (Votta et al., n.d.), the mechanisms by which the intervention impacts outcomes remain unknown. One possible explanation is that participation in Mood Lifters™ increases factors related to resilience, reducing the likelihood of negative outcomes in the context of adversity. In fact, the Mood Lifters™ intervention dedicates significant session time to teachings related to social relationship quality and coping skills (Votta et al., n.d.). If Mood Lifters™ increases social and coping skills, participants may report greater feelings of social support and greater use of active coping strategies. Changes in these resilience factors may help explain the impact of the intervention on mental health outcomes. Additionally, it is possible the impact of the intervention on resilience factors and mental health may vary as a function of stress exposure. Therefore, cumulative stress exposure, the relative influence of childhood adversity, recent negative life events, and daily hassles should be considered. Support for Mood Lifters™ as an effective, low-cost group intervention that significantly promotes both the development of factors related to resilience and improvements in mental health would greatly increase access to care.

Aims & Hypotheses

Study three of this dissertation seeks to examine whether participation in Mood Lifters™ impacts self-reported use of social support, coping skills, and symptoms of anxiety, depression, and perceived stress. In order to assess resilience, the project measures exposure to early life events, recent life events, and daily hassles. Further, this study investigates whether

improvements in factors related to resilience provide a mechanism by which the Mood Lifters™ intervention influences the impact of stress exposure on rates of anxiety, depression, and perceived stress. The specific aims of this study are to:

1. Assess whether participation in the Mood Lifters™ intervention impacts self-reported social support or use of coping skills.
2. Examine whether changes in use of social support or coping skills provide a mechanism by which the Mood Lifters™ intervention impacts perceived stress and symptoms of anxiety and depression.
3. Investigate the moderating role of different types of stress exposure (i.e., early life stress, recent life events, and daily hassles) on the relationship between use of social support and coping skills and the outcomes of perceived stress, anxiety, and depression.

Method

Participants

Participants were 102 adults who were recruited either through advertisements in the community and on Facebook or through responding to posts on UMHealthResearch. Interested participants contacted the study team by email to express interest in the group. They were then given more details about the group and asked to complete a screening questionnaire on the survey hosting website Qualtrics. Participants who endorsed psychotic, manic or suicidal symptoms were contacted by a study team member to determine eligibility. Participants endorsing current symptoms of psychosis or mania or current suicidal ideation were excluded from the study and provided referrals. Eligible participants were randomly assigned to one of three conditions (i.e., Mood Lifters™ groups run by professionals (n = 37), Mood Lifters™

groups run by peers (n =40) and a waitlist control condition (n = 25). However, if participants were available for only one group time in their assigned condition, they were assigned to that group time. If they were available for multiple groups times in their assigned condition, they were randomly assigned to the available group times. If they were randomly assigned to one of the two treatment groups but could not attend any of the groups within the condition (peer or professional) they were assigned, they were assigned to a group in the other active treatment condition (peer to professional = 19, professional to peer = 16). Randomization followed this process until groups were full. This process was replicated for newly recruited eligible participants for each of the three rounds of groups that were run for the study. At the end of the active treatment groups, the participants from the waitlist were randomly assigned to one of the two treatment conditions (i.e., peer or professional). Some waitlist participants did not respond to follow up and did not complete the groups (only 18 participants completed waitlist measures and went on to be part of the groups). See Consort Flow diagram (Figure 4.1) for additional information on randomization (Schulz, Altman, Moher, & CONSORT Group, 2010). The current study collapsed across peer and professional groups into one single intervention group (n = 77). Differences in outcomes based on peer and professional leaders were not found as examined elsewhere (Votta et al., n.d.).

Qualified participants in both the intervention and waitlist control groups were sent a series of questionnaires on Qualtrics that served as the pre-group measures. These took approximately 1.5 hours to complete. All questionnaires were completed in a randomized order in order to reduce fatigue effects. Participants in the intervention group completed these same questionnaires again after their participation in the program. Waitlist control participants completed these questionnaires a second time 15 weeks after completing the first set of

questionnaires. Participants were not compensated for participating in the groups or questionnaires; participation was entirely voluntary. However, they were compensated for completing online measures at 1 month and 6 months after completion of the groups. Participants were also reimbursed for weekly parking for the meetings. Data for the current study includes responses for the pre and post measures only. Future studies will investigate the longer-term follow-ups (1 month and 6 months). The study protocol was approved by the University of Michigan Institutional Review Board.

Study Procedures

Leader Training. Leaders were either graduate students in a clinical psychology program or a psychologist (professional leaders) or former pilot Mood Lifters™ group members (peer leaders). All leaders, regardless of peer/professional status, completed the Mood Lifters™ program as a participant. After completion of the program, leaders attended a day-long Mood Lifters™ Leader Training. This training including background information about the development of the program, the role of the leader and important leader characteristics, clinical skills (i.e., effective communication, listening, self-disclosure, group management), when to break confidentiality rules, and how to respond to crisis situations (i.e., dangerous or suicide situations). Each leader then led one a pilot group with another co-facilitator. At that point, it was determined that they were capable of leading a group for the randomized control trial.

Mood Lifters™ Intervention. The Mood Lifters™ program was developed by Dr. Patricia Deldin and colleagues at the University of Michigan. The details of the program development are presented elsewhere (Votta et al., n.d.).The program consists of weekly meetings that review topics and skills critical for improving mental health.

At the beginning of each meeting, participants completed a brief "check-in" questionnaire on paper. This questionnaire included visual analog scale questions asking about activity level, mood, negative thoughts, relationships, and sleep. Additionally, the questionnaire asked about psychotic, manic, and suicidal symptoms. If participants endorsed any of these symptoms, the meeting leader would discuss their responses with them at the end of the meeting. If a participant became ineligible (i.e., high-level suicide risk or significant disruptive psychotic or manic symptoms), the meeting leader followed risk protocol and referred the participant to the appropriate resources. This did not occur during the feasibility study.

After completing the "check-in" questionnaire, participants briefly talked to one of the leaders about the "points" that were earned that week and any barriers they had with understanding or engaging with the material from the previous meeting. During each weekly session, participants earned points by engaging in activities consistent with that weeks' topic and were provided with a goal for a certain number of points to earn. For example, after the sleep group, participants were given the challenge to earn 14 points over the week by utilizing two of the sleep hygiene techniques per day. The first 10-15 minutes of each meeting were reserved for these conversations and they lasted approximately 2-5 minutes depending on participant comments and questions. Next, all participants came together as a group and spent approximately five minutes discussing barriers to their earning "points" or engaging with the material outside of the meeting. During this time, participants could share how they had overcome barriers and leaders shared evidence-based strategies for overcoming barriers (if applicable).

After these discussions, leaders introduced the topic for that meeting. Topics for the meetings were as follows (in chronological order): Introduction to Mood Lifters™ & Behavioral

Change, Sleep Hygiene, Thought Awareness, Thought Challenges, Exercise, Emotional Awareness, Emotion Regulation, Making Connections, Values in Action, Sleep Cues, Apologizing, Problem-Solving, Forgiveness, Nutrition & Hydration, Character Strengths, and Wrap-Up. Leaders shared basic psychoeducation about and the most recent research on the topic of the meeting. Participants followed along with the material in their participant manual and engaged with various activities and worksheets related to the topic. After reviewing the material and completing the activities, leaders specifically outlined how to earn "points" for the meeting to encourage participants to practice what was learned outside of the meeting. Lastly, participants had time to plan out when they would earn their points before the next meeting. Over the course of the next week, participants attempted to earn points by engaging in skills taught during that week's meeting. Participants could also gain points by engaging activities from previous meetings. Skills fell into 6 categories: Behavior, Sleep, Mood, Body, Mind, and Social. Once each topic was presented in a Mood Lifters™ meeting, participants had a point goal associated with that category and were able to gain points by engaging in activities or skills associated with that category (e.g. cognitive restructuring = Mind points; spending time with a friend = Social points).

Data collection. After consenting to participate, participants completed a series of randomized questionnaires on the online survey platform Qualtrics. At the end of the first round of groups, waitlist participants were randomly assigned to either a "peer" or "professional" Mood Lifters™ group. Participants attended weekly Mood Lifters™ meetings for 15 weeks. Prior to the last meeting, participants were asked to complete the same series of randomized questionnaires on Qualtrics. Similar data was collected at 1-month and 6-month post completion of the groups. Additionally, at every meeting, prior to starting the session, participants completed

a check in form asking about their mood and experiences in the past week using a visual analog scale (VAS; i.e., positive/negative emotions, relationships, thoughts, activity level). This form also included the Patient Health Questionnaire-4 (PHQ-4) to assess for symptoms of anxiety and depression.

Measures

Full measures are presented elsewhere (Votta et al., n.d.). This section includes measures used in the current study and does not reflect all measures collected as a part of this RCT.

Predictors. We assessed the impact of the treatment via both treatment condition and level of engagement. Treatment condition referred to whether participants were in the active intervention condition, and thus participated in the Mood Lifters™ program, or were on the waitlist and comprised the control group. Level of engagement was assessed via total points obtained. Total number of points provided a metric of engagement in the program since participants earned points by utilizing the skills taught in each Mood Lifters™ lesson. As the program progresses and participants learn more skills, the goal for points each week increases. At week 1, participants were encouraged to try to earn 5 points, whereas by week 15, the goal was 33 points.

Outcomes. *Perceived Stress.* Perceptions of stress at time 1 and time 2 were measured via the Perceived Stress Scale (Cohen, Kamarck, & Marmelstein, 1983). Total perceived stress is represented by the sum of responses on this scale. The PSS shows good internal reliability, with the validation paper reporting a range of Cronbach's α of 0.84-0.86 (Cohen et al., 1983). In the non-imputed data for this study, the Cronbach α was 0.89 at Time 1 and 0.88 at Time 2.

*Anxiety***.** Symptoms of anxiety were captured through the General Anxiety Disorder 7 scale (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006). The GAD-7 shows great internal

reliability; the validation paper reports a Cronbach's α of .92 (Spitzer et al., 2006). In the non-imputed sample, the Cronbach α was 0.87 at Time 1 and 0.91 at Time 2.

Depression. Symptoms of depression were captured through the Patient Health Questionnaire 9 (PHQ-9; Spitzer, Kroenke, & Williams, 1999). This measure shows good internal reliability, with the validation paper reporting a Cronbach's α of 0.86-0.89 (Kroenke, Spitzer, & Williams, 2001). In the non-imputed data, the Cronbach α was 0.85 at Time 1 and 0.80 at Time 2.

Coping skills and Social Support. The Brief COPE (Carver, 1997) was used to assess the use of various types of coping strategies. Participants rate how often they use coping strategies that fall into the following categories: emotional support, instrumental support, venting, denial, behavioral disengagement, self-blame, active, planning, acceptance, positive reframing, religion, and substance abuse. Based on the methodology of Steinhardt and Dolbier (2008), we used factor analysis to group together similar coping strategies. The factor analysis identified 4 categories of coping skills: 1) Support Seeking (emotional support, instrumental support, religion, and venting); 2) Avoidant coping (humor, acceptance, substance use, and self-distraction); 3) Approach coping (active, positive reframing, and planning); and 4) Disengagement (self-blame, behavioral disengagement, and denial). In the non-imputed data set, three of the summary scales demonstrated good reliability: Support Seeking: $\alpha = 0.76$, Approach: $\alpha = 0.83$, and Disengagement: $\alpha = 0.62$. These reliability coefficients are consistent with the reliability demonstrated in the factors used by Steinhardt and Dolbier (2008; e.g. 4 factors ranging from $\alpha =$ 0.71-0.80). The reliability of the Avoidant coping subscale was lower (Cronbach's $\alpha = 0.47$), and this low reliability will be considered when interpreting results.

Covariates and Mediators. *Recent Life Events.* We used a modified version of the Recent Life Events Questionnaire (RLEQ) to assess the experience of common negative life events over the past year (T. Brugha, Bebbington, Tennant, & Hurry, 1985). Instead of asking participants to indicate whether this event "still affects me," participants rated how much the event affected them on a Likert rating scale (0 = not at all, 1 = slightly, 2 = somewhat, 3 = Moderately, 4 = Extremely). The RLEQ has been shown to have high test-retest reliability (Cohen's Kappa = 0.84; T. S. Brugha & Cragg, 1990). The present study used created a scale of the total number of events endorsed which demonstrated good reliability (α = 0.78).

Childhood Trauma exposure. The Childhood trauma questionnaire (Bernstein et al., 2003; Bernstein, Fink, & Foote, 1998) was used to assess the experience of childhood adversity. Participants rate the frequency of each event that occurred during their childhood on a scale ranging from 1 (Never true) to 5 (Very often true). The total score was used in the current study to capture total exposure to trauma in childhood. Previous studies found that internal consistency reliability for the CTQ ranged from 0.66 to 0.92 across several samples (Bernstein et al., 2003, 1998). In the non-imputed data, the Cronbach α for the total score was 0.93.

Daily Hassles. The Daily hassles scale (Kanner et al., 1981) was used to assess the experience of daily hassles. Participants choose from 122 events and rate the severity of any events they are currently occurring (1- somewhat severe, 2- moderately severe, 3- extremely severe). This measure shows good internal reliability, with the validation paper reporting a Cronbach's α of 0.95 (Kanner et al., 1981). In the non-imputed data, the Cronbach α for the total score was 0.97.

Data Analytic Strategy

Participants were collapsed across leader types (clinician and peer-led groups). The impact of leader type will be included as a covariate during sensitivity analysis. Differences in treatment response based on leader type was assessed elsewhere (Votta et al., n.d.). Two groups will be compared - adults in the intervention program (experimental condition) and those in the waitlist comparison group (control condition). Measures of skewness and kurtosis were assessed for all measures to ensure normality. Measures with a kurtosis greater than 1 or less than -1 or a skewness greater than 3 or less than -3 were log-transformed prior to running regression analyses. Change scores were computed for each subscale by subtracting time 1 scores from time 2 scores. For continuous variables, means (standard deviations) for time 1, time 2, and change scores are reported by group (see Table 4.2).

Post measure data was missing for 19 participants (3 waitlist and 16 experimental, 18.6% of the sample). Missing data was managed with multiple imputation techniques based on best practices in longitudinal analyses (Jakobsen, Gluud, Wetterslev, & Winkel, 2017). Littles' test of missingness was performed and it was not significant (X^2 (1042, N = 200) = 261.867, p = 1.000), suggesting that the data were missing completely at random (MCAR; Little & Yau, 1996). Recent literature states that if there is reasonable doubt that the data are MCAR, even if Little's test was insignificant, and greater than 5% of the data are missing, multiple imputation is warranted to ensure the results are not biased (Jakobsen et al., 2017). Since 18.6% of the data was missing, multiple imputation was completed via PROC MI in SAS. We used the Markov Chain Monte Carlo (MCMC) method and multiple chains, which completes 200 burn-in iterations before each imputation, to impute 40 data sets. The 200 burn-in iterations are used to make the iterations converge to the stationary distribution before the imputation. After imputation, regression analyses were completed using the MIANALYZE procedure. This

procedure reads parameter estimates and associated standard errors or covariance matrices that are computed by the regression for each imputed data set. The MIANALYZE procedure then combines the results of the analyses on each imputed data set in order to generate a valid statistical inference for the full sample. All regression analyses predicting change scores controlled for time 1 levels as change may vary as a function of starting levels due to ceiling and floor effects. A level of 0.05 will be used to assess statistical significance.

For the coping sub-scales, we completed exploratory and principal components factor analysis to determine whether the various subscales clustered together as factors. The factor analysis identified 4 categories of coping skills: 1) Support Seeking (emotional support, instrumental support, religion, and venting); 2) Avoidant coping (humor, acceptance, substance use, and self-distraction); 3) Approach coping (active, positive reframing, and planning); and 4) Disengagement (self-blame, behavioral disengagement, and denial). The 4 factors generated as a result of this process were used in all regression models. Regression was used to assess the relationship between participating in the intervention and changes in coping skills, social support, and mastery. Regression analyses predicting change scores controlled for time 1 levels of the outcome since change may vary as a function of starting levels due to ceiling and floor effects. We also examined whether changes in coping skills, social support, and mastery predicted changes in perceived stress or symptoms of anxiety and depression. Mediation using the Sobel Test was used to assess whether changes in the mediator variables (i.e., social skills, coping skills, mastery) mediate the association between participating in the intervention and changes in outcomes (i.e., anxiety, depression, perceived stress). Although best practices suggest utilizing bootstrapping to test mediation, recent research suggest that using bootstrapping with small sample sizes actually inflates the Type I error rate (Koopman, Howe, Hollenbeck, & Sin,

2015). Koopman and colleagues (2015) found that the Sobel Test demonstrated comparable power to bootstrapping in small samples without the increase of a Type I error.

Given the importance of assessing stress exposure for studies investigating resilience (Chmitorz et al., 2018; Kalisch et al., 2017, 2015), we examined whether childhood trauma, recent life events, or daily hassles moderated the association between participating in the intervention and changes in social support, coping skills, perceived stress, or internalizing symptoms. Each index of life event exposure was assessed in a separate regression to determine the relative impact of different types of life events on the effectiveness of the intervention.

Results

Sample characteristics

A total of 102 participants (77 intervention, 25 waitlist) participated in this study. See Table 4.1 for demographic data. Within the experimental condition, the average number of points obtained was 301.233 (SD = 96.103, range: 39 – 411). A person who earned all their points for all meetings would have a total of 429 points at the end of the program. Therefore, the average participant in the program earned 70% of the total point goal, suggesting a high degree of engagement.

Means and standard deviations of the coping skills, outcome variables, and life events scales (collected at time 1 only) are presented by group and timepoint in Table 4.2. Correlations between all variables at time 1 and time 2 are presented in Table 4.3 and Table 4.4, and correlations between all life events variables and all change scores are presented in Table 4.5.

Mood Lifters™ intervention impact on anxiety, depression, and perceived stress

Anxiety, depression, and perceived stress ratings at time 1 and time 2 and the change scores from time 1 to time 2 were all significantly correlated with one another (see Table 4.3,

Table 4.4, and Table 4.5). The impact of the Mood Lifters^{TM} intervention on anxiety, depression, and perceived stress was previously reported by Votta et al. (n.d.). Both participants in the intervention condition and those who obtained more points reported greater reductions in anxiety from time 1 to time 2 compared to participants in the control condition (condition: b = -2.76, p = 0.0026; treatment engagement: b = -0.008, p = 0.0004). We also observed a significant interaction in which participants in the intervention condition demonstrating greater anxiety at time 1, reported greater reductions in anxiety from time 1 to time 2 (b = -0.48, p = 0.0238). Neither condition nor treatment engagement was associated with changes in depression from time 1 to time 2 (see Table 4.6). Condition was not significantly associated with changes in perceived stress from time 1 to time 2 (see Table 4.6). However, greater engagement, was associated with reductions in perceived stress from time 1 to time 2 at trend level (b = -0.008, p = 0.0516).

Aim 1: Mood Lifters^{TM} intervention impact on social support and coping skills

Correlations between support seeking and the coping skills of approach, avoidance, and disengagement are presented in Table 4.3, Table 4.4, and Table 4.5. Participants in the intervention condition reported greater increases in support seeking from time 1 to time 2 compared to participants in the control condition (b = 2.67, p = 0.005). Additionally, participants with greater engagement also reported greater increases in support-seeking behaviors from time 1 to time 2 (b = 0.007, p = 0.0032) (see Note: Change for each subscale was calculated as time 2 levels – time 1 levels.

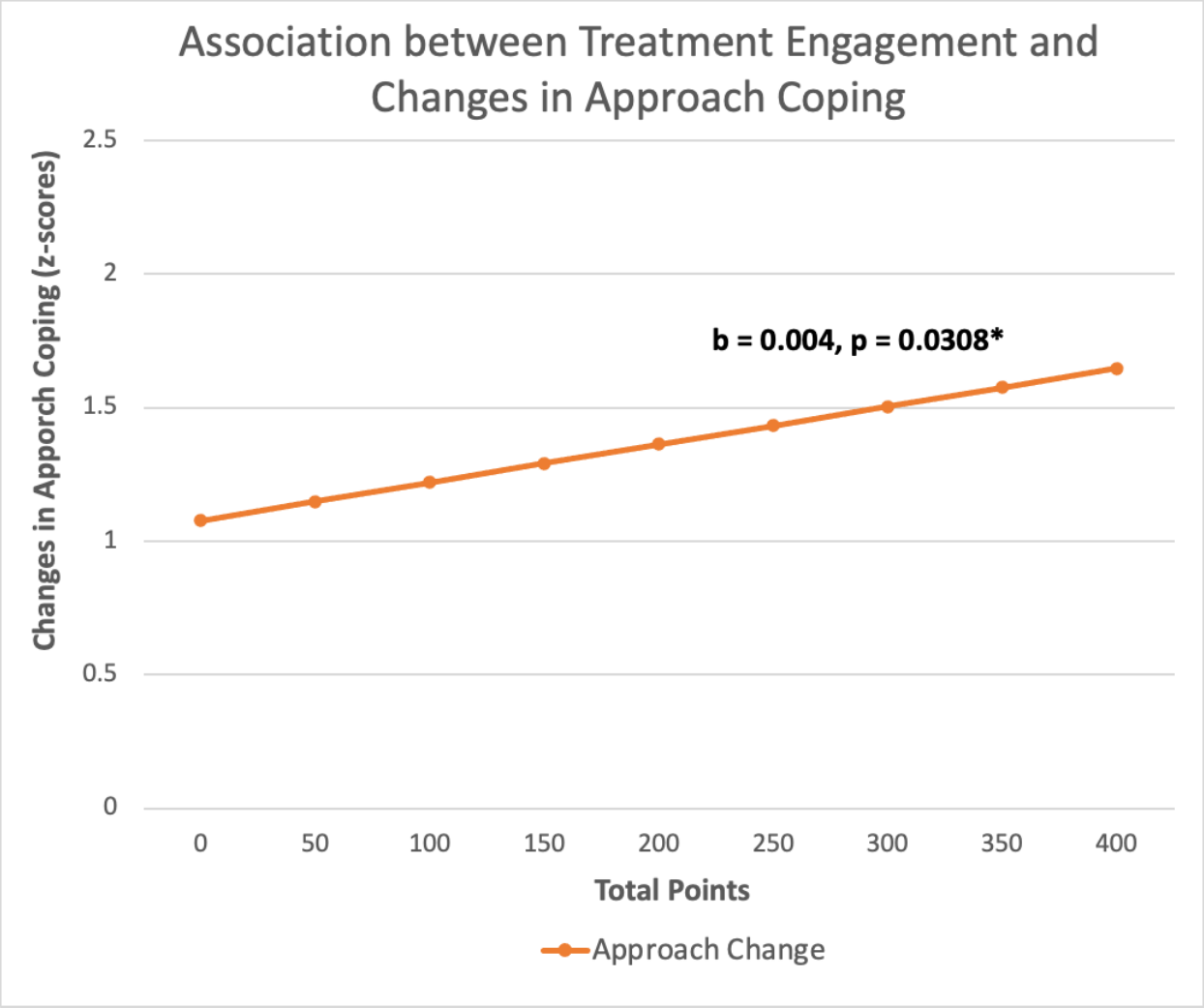
$^{+}$ = trend level (less than or equal to 0.08), * p <0.05, ** p < 0.01, *** p < 0.001

Figure 4.2). We also observed an impact of engagement on change in approach behaviors in the participants who obtained more points reported greater increases in approach behaviors from time 1 to time 2 ($b = 0.004$, $p = 0.0308$) (see Figure 4.3). There was no impact of condition or total points obtained on changes in avoidance or disengagement from time 1 to time 2 (see Table 4.7).

Aim 2: Associations between changes in coping skills and changes in outcomes

Correlations between coping skills and outcomes at time 1 and time 2 are presented in Table 4.3 and Table 4.4. Correlations between changes in coping skills and changes in outcomes are detailed in Table 4.5. Results from the regression analyses investigating the association

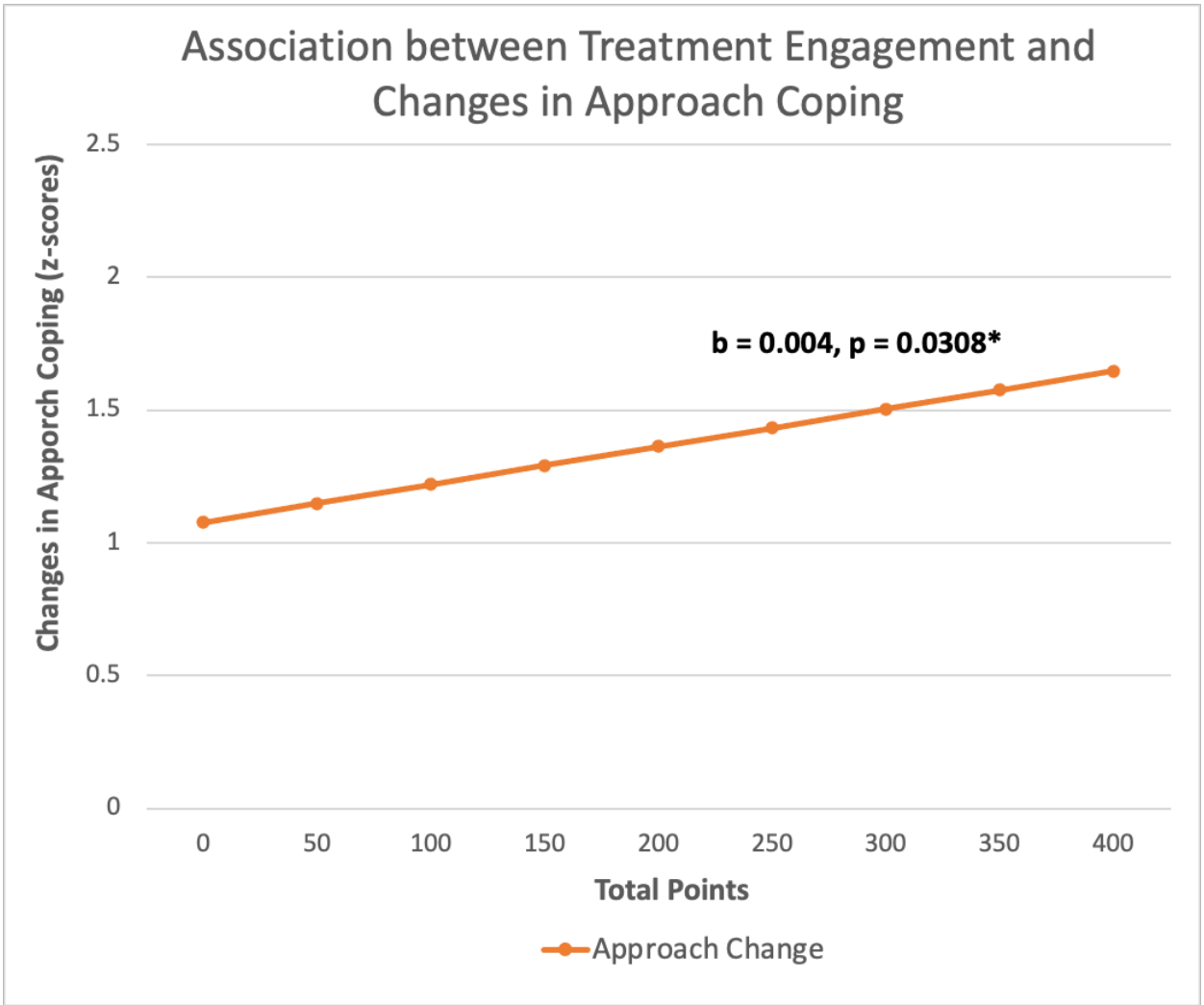
between coping skills and outcomes are presented in Figure 4.3 **Association between Treatment Engagement and Changes in Approach Coping**



*Note: Change in coping skills was calculated as time 2 - time 1, so positive change scores suggest greater use of the coping skills reported in that category at time 2 compared to time 1.

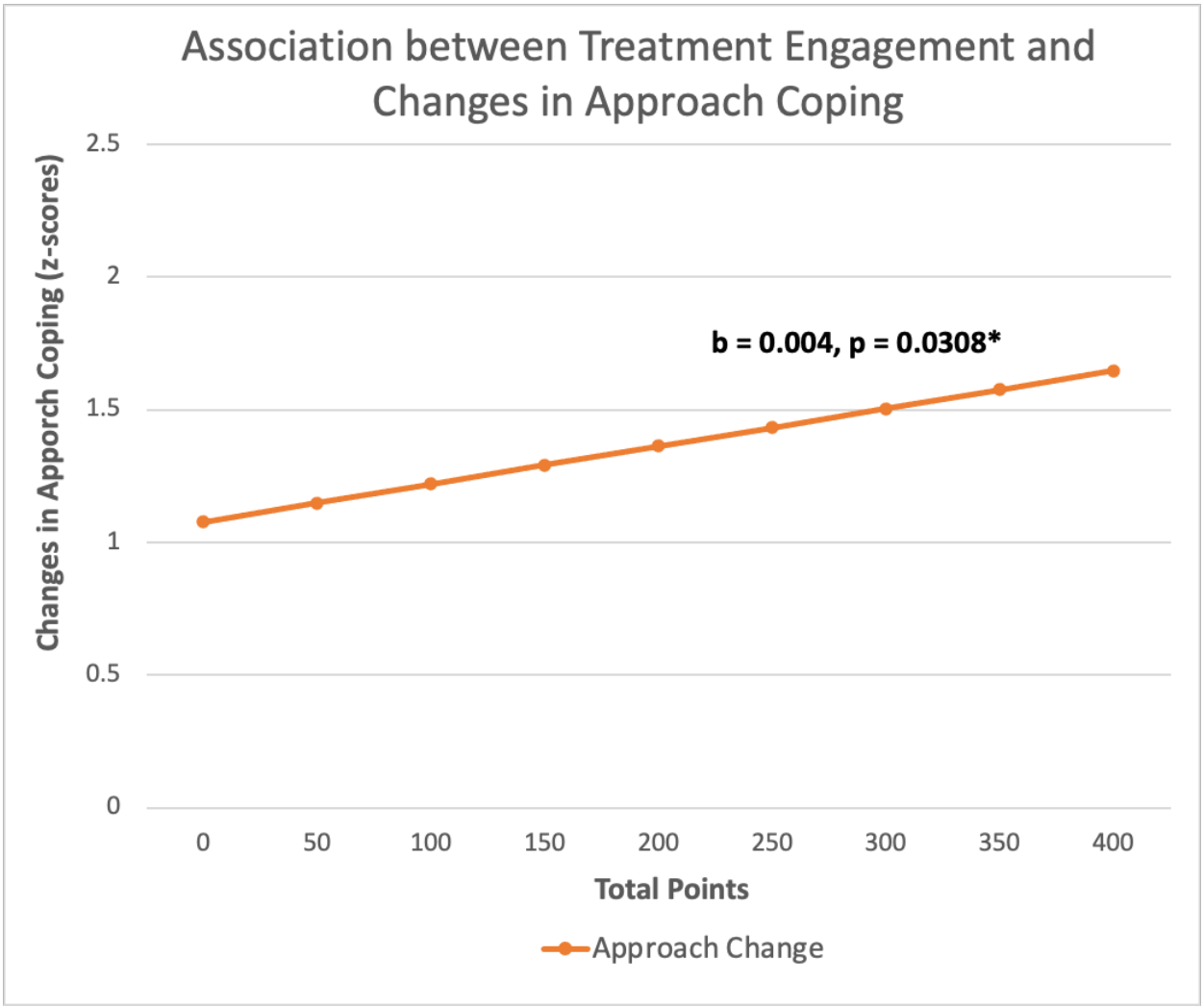
Table 4.8. Participants who reported greater increases in support seeking from time 1 to time 2 demonstrated greater reductions in anxiety at trend level (b = -0.2218, p = 0.0596) and greater reductions in perceived stress (b = -0.46, p = 0.0174) (see Figure 4.4). Change in support seeking did not significantly predict change in depression from time 1 to time 2 (see Figure 4.3

Association between Treatment Engagement and Changes in Approach Coping



*Note: Change in coping skills was calculated as time 2 - time 1, so positive change scores suggest greater use of the coping skills reported in that category at time 2 compared to time 1.

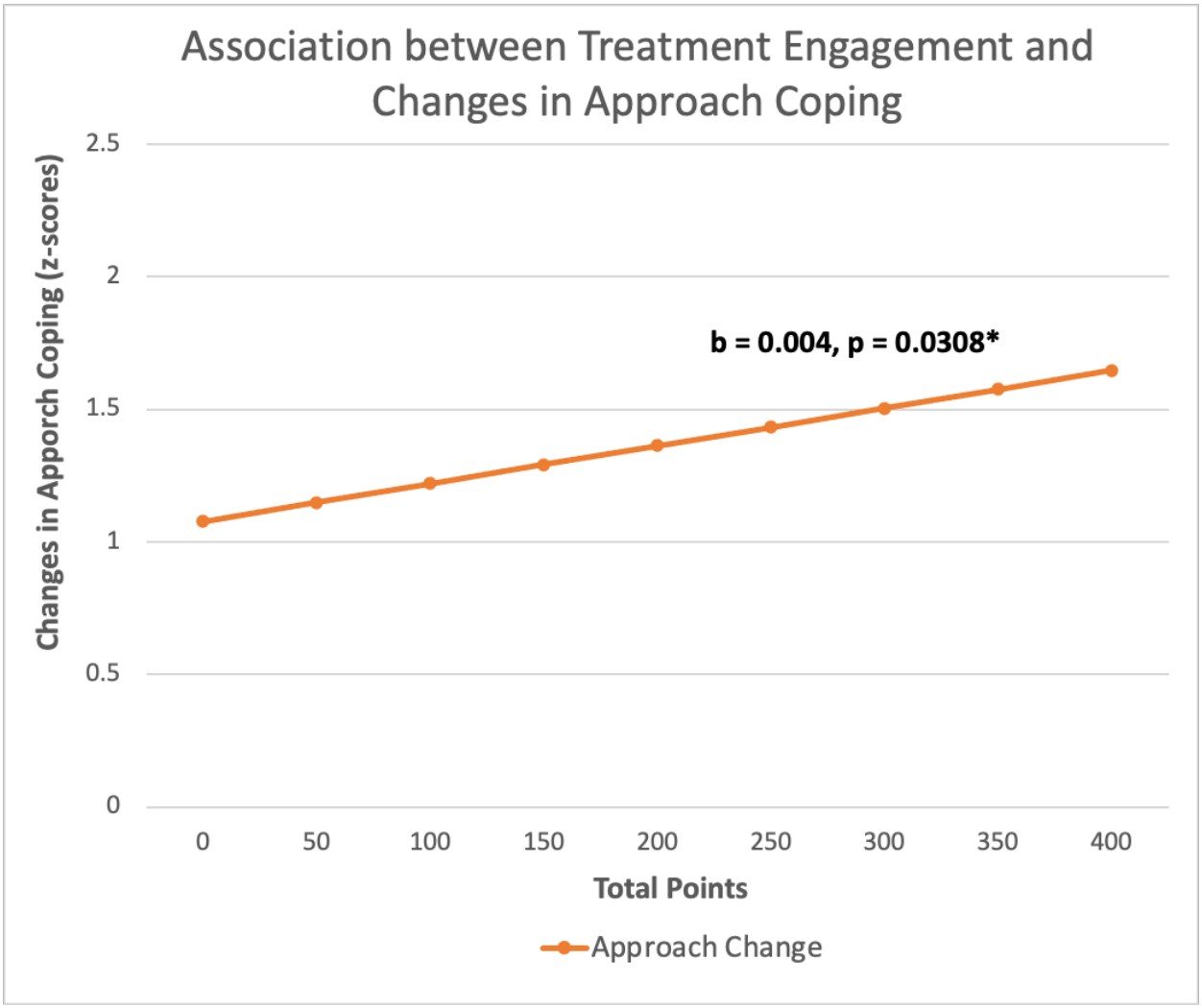
Table 4.8). Increases in approach behaviors from time 1 to time 2 were associated with reductions in anxiety at trend level (b = -0.26, p = 0.0612) and with significant reductions in perceived stress (b = -0.75, p = 0.0003) (see Figure 4.4). Decreases in disengagement from time 1 to time 2 were significantly associated with reductions in anxiety (b = 0.61, p = 0.0016) and perceived stress 2 (b = 1.53, p < 0.001) from time 1 to time 2 (see Figure 4.4). There were no significant associations between changes in avoidance related behaviors and changes in anxiety, depression, or perceived stress (see Figure 4.3 **Association between Treatment Engagement and Changes in Approach Coping**



*Note: Change in coping skills was calculated as time 2 - time 1, so positive change scores suggest greater use of the coping skills reported in that category at time 2 compared to time 1.

Table 4.8).

As detailed in the previous sections, participating in the Mood Lifters™ intervention is associated with a reduction in anxiety (see Table 4.6) and an increase in support seeking (see Figure 4.3 **Association between Treatment Engagement and Changes in Approach Coping**



*Note: Change in coping skills was calculated as time 2 - time 1, so positive change scores suggest greater use of the coping skills reported in that category at time 2 compared to time 1.

Table 4.8). Although only significant at trend level, increases in support seeking were associated with greater reductions in anxiety from time 1 to time 2 (b = -0.2218, p = 0.0596). Therefore, we sought to determine whether changes in support seeking may mediate the impact of participating in the intervention on changes in anxiety from time 1 to time 2. The Sobel test was not significant (b = -1.55, SE = 0.38, p = 0.12), suggesting that changes in support seeking did not mediate the association between participating in the intervention and changes in anxiety from time 1 to time 2.

Aim 3: Impact of life events on the association between the intervention and changes in coping skills

Correlations between life events, time one levels of coping skills, anxiety, depression, and perceived stress, and changes in coping skills, anxiety, depression, and perceived stress are presented in Table 4.3, Table 4.4, and Table 4.5. Reports of childhood trauma, recent life events, and daily hassles were all significantly positively correlated (see Table 4.3). Greater exposure to childhood trauma was associated with reduced support seeking at time one (r = -0.19, p = 0.0518). Increased exposure to recent life events was associated with greater depression symptoms at time one (r = 0.20, p = 0.0389). Greater exposure to daily hassles was associated with reduced support seeking (r = -0.19, p = 0.0503), increased use of disengagement (r = 0.41, p < 0.0001), and greater symptoms of anxiety (r = 0.48, p < 0.0001), depression (r = 0.43, p < 0.0001), and perceived stress (r = 0.64, p < 0.0001), at time one. Looking at change scores, greater childhood trauma exposure was associated with greater reductions in anxiety symptoms from time 1 to time 2 (r = 0.26, p = 0.019). There were no significant associations between recent life events, daily hassles, and changes in coping skills or outcomes (see Table 4.5).

Table 4.9 displays the results from the regression analyses investigating whether exposure to life events influences the association between participating in the intervention and changes in coping skills. We observed a significant interaction in which among individuals reporting greater daily hassles at time 1, greater engagement was associated with greater reductions in avoidance coping from time 1 to time 2 (b = -0.0002, p = 0.0313). Daily hassles, childhood trauma, or recent life events did not influence the relationship between participating in the intervention and changes in support seeking, approach, or disengagement coping from time 1 to time 2 (see Table 4.9).

Finally, we used regression analyses to determine whether exposure to life events influenced the association between changes in coping skills and changes in outcomes from time 1 to time 2. Results from these regression analyses are presented in Table 4.10. Life events did not influence the association between changes in coping skills and changes in depression from time 1 to time 2 (see Table 4.10). However, we observed a significant interaction when examining changes in anxiety. Specifically, for individuals reporting greater childhood trauma at time 1, increases in approach related coping from time 1 to time 2 were associated with greater reductions in anxiety symptoms (b = -0.01, p = 0.0505). We also observed a significant interaction in which for individuals reporting greater childhood trauma, greater increases in avoidance was associated with reductions in anxiety symptoms from time 1 to time 2 (b = -0.01, p = 0.05452). We also observed significant interactions in models predicting perceived stress. For individuals reporting greater daily hassles, greater reductions in approach was associated with greater reductions in perceived stress symptoms from time 1 to time 2 (b = 0.02, p = 0.0418).

Discussion

The present study investigated the impact of the Mood Lifters™ intervention on changes in coping skills and examined whether changes in coping skills as a result of participating in the program also influenced changes in anxiety, depression, or perceived stress. We found that participating in the Mood Lifters™ intervention was associated with greater use of support seeking and approach coping behaviors. Reductions in disengagement coping were associated with reductions in symptoms of anxiety, depression, and perceived stress and increases in approach and support seeking were associated with reductions in anxiety and perceived stress symptoms. Further, we found that the experience of childhood trauma, recent life events, and daily hassles moderated the association between participating in the intervention and changes in coping skills and outcomes

This study replicated results from Votta et al. (n.d.) demonstrating the significant impact of participating in the Mood Lifters™ intervention on reducing symptoms of anxiety and perceived stress. The present study adds to the support for Mood Lifters™ as an effective intervention by demonstrating that participating in the intervention is associated with increased use of support seeking and approach behaviors to cope with stressors. Participants in the intervention condition and those who reported greater engagement demonstrated greater increases in support seeking from time 1 to time 2 compared to participants in the control condition and those who reported less engagement. In contrast, changes in approach coping were only significant for engagement. Participants who obtained more points reported greater increases in approach behaviors from time 1 to time 2. There was no impact of condition or total points obtained on changes in avoidance or disengagement from time 1 to time 2. Therefore, engagement in the Mood Lifters™ intervention appears to increase the use of social support and

adaptive, problem-focused coping (e.g., approach coping) but does not result in a decrease in maladaptive, emotion-focused coping skills (e.g., avoidance and disengagement). These findings may reflect variations in the effectiveness of coping strategies for different types of stressors. For instance, for individuals who have been exposed to childhood trauma, avoiding trauma reminders may correspond with reduced experience of anxiety and stress. In contrast, for individuals struggling with greater daily hassles, approach related behaviors and support seeking may lead to reductions in anxiety and perceived stress. Furthermore, the Mood Lifters™ modules on emotion regulation teach effective coping skills and individuals can earn points by engaging in those skills. However, there is no penalty for continuing to use more maladaptive coping skills. In fact, Mood Lifters™ teaches participants that when emotions are high, disengaging from the situation with the goal of returning to it later may be an effective strategy to avoid unwanted behavioral reactions (e.g. verbal or physical aggression when angry). Finally, radical acceptance is a coping skill from Dialectical Behavioral Therapy (DBT) that encourages individuals to practice acceptance when faced with a challenge they have no power over (Linehan, 2014). In the factor analysis of coping strategies, radical acceptance loaded most highly on the category of avoidance. However, based on the teaching of Mood Lifters™ and DBT , this coping strategy is more related to accepting one's circumstances in order to move forward, rather than avoiding a problem. This strategy may be particularly effective when faced with a stressor one of has no control over (e.g. a pandemic).

We sought to determine whether changes in coping skills provided a mechanism by which the Mood Lifters™ intervention influence symptoms of anxiety and depression and reports of perceived stress. Individuals who reported greater increases in support seeking and approach-related behaviors also reported greater reductions in anxiety and perceived stress from

time 1 to time 2. Further, participants who reported greater reductions in disengagement coping also reported greater decreases in depression and perceived stress. These findings suggest that changes in coping skills may influence the impact of the intervention on mental health outcomes. In order to examine whether changes in coping skills mediate the effect of the intervention on mental health outcomes, we needed to demonstrate: 1) the intervention was significantly associated with changes in outcomes, 2) the intervention was significantly associated with changes in coping skills, and 3) changes in coping skills were significantly associated with changes in outcomes. These three criteria were only fulfilled for the association between participating in the intervention, changes in support seeking, and changes in anxiety. Using the Sobel Test, we examined whether changes in support seeking mediated the impact of the intervention on changes in anxiety. The Sobel test was not significant, suggesting that increases in support seeking cannot fully account for the reductions in anxiety associated with participating in the intervention. Therefore, although changes in coping skills, particularly increases in support seeking, may play an important role in the efficacy of the Mood Lifters^{TM} intervention on influencing mental health, additional components of this intervention contribute to the positive effects on anxiety symptoms.

The study also examined whether the experience of childhood trauma, recent life events, and daily hassles moderated the association between participating in the intervention and changes in coping skills and outcomes. We found that for individuals reporting greater daily hassles, greater engagement in the intervention was associated with greater reductions in avoidance coping. We also observed a significant interaction in which for individuals reporting greater daily hassles, greater change in approach was associated with reduced change in anxiety symptoms from time 1 to time 2. For participants reporting greater childhood trauma, increases

in avoidance related coping and disengagement from time 1 to time 2 were associated with greater reductions in anxiety and perceived stress symptoms. These findings are in line with previous research suggesting that coping skills vary in adaptability based on the context (Folkman, 1984; Lazarus & Folkman, 1984; Steinhardt & Dolbier, 2008). Compared to the experience of childhood trauma, daily hassles and one's response to these irritants, are more within one's control, so the use of problem-focused coping skills such as approach coping may be more effective (Mahmoud et al., 2012). Decreased use of avoidance coping when confronted with daily hassles may go hand in hand with increases in approach coping and result in a resolution to the stressful situation and decreased mental health difficulties (Mahmoud et al., 2012). In contrast, the experience of childhood trauma is outside an individual's control and therefore more emotion-coping strategies, such as avoidance and disengagement, may be better suited to coping with these stressors (Steinhardt & Dolbier, 2008). Further, the avoidance sub-scale included acceptance and the coping strategy of radial acceptance has been shown to be highly adaptive for individuals who have experience childhood trauma (Görg et al., 2017). These findings suggest that the Mood Lifters™ intervention encourages individuals to develop the appropriate coping skills needed to adequately cope with the stressors unique to their circumstances.

Although this study has a number of strengths, it also has some limitations. The most significant limitation of the study is the limited sample size. Although the researchers completed several "rounds" of groups during the duration of the study in order to reach a sufficient sample size, drop out and scheduling conflicts led to a final sample size that was smaller than anticipated. Per Votta et al., (n.d.), retrospective power analyses suggest that the study was underpowered for various research questions (i.e., effect of treatment condition on perceived

stress and depressive symptoms, and effect of homework on depressive symptoms,.37-.42), which is far below the recommended threshold of .80 (Cohen, 1988). We utilized multiple imputation methods in order to bolster power, but a larger study is needed to confirm the effectiveness of the Mood Lifters™ Intervention. A larger study would allow for a better analysis of the effects of the program on outcomes, social support, and coping skills and a more effective examination of mediators and moderators. Further, the study was limited by a predominantly white and female sample, due to the location of the study and help-seeking populations. Men and individuals from traditionally marginalized racial and ethnic groups may be less likely to seek out and engage with mental health care (Steele, Dewa, & Lee, 2007; Villatoro, Mays, Ponce, & Aneshensel, 2018), suggesting the importance of understanding whether these traditionally underserved groups will engage with and benefit from the Mood Lifters™ program. Future studies should examine the effects of the Mood Lifters™ intervention in samples that include more racial, ethnic, and gender diversity. Additionally, participants in this trial had to be assigned to different conditions due to scheduling conflicts. A larger study with more concurrent groups could support a design that would allow for true randomization. Further, participants in our sample were not selected for any type of mental health difficulty or disorder. In fact, many participants who were included did not reach above the "mild" threshold for either generalized anxiety or depressive symptoms. This was intentional, as Mood Lifters™ was not intended for a specific population or mental illness. However, this may have weakened the findings across the entire program, as people with lower scores may make less improvement overall. Additionally, it is not possible to complete an intent-to-treat analysis as participants were lost to follow up and no additional data was collected after drop out.

In conclusion, this study shows continued support for the efficacy of the Mood Lifters™ program and suggests that this program may improve the use of social support and approach coping to manage stressors. Participation in this program may help bolster resilience by differentially promoting the development of coping skills related to an individual's unique life experience (e.g., the experience of childhood trauma compared to daily hassles). Support for this low-cost, peer-led, group intervention may help reduce access to care barriers and promote mental well-being for those who have been traditionally underserved.

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Figure 4.1 Consort Flow Diagram of Recruitment

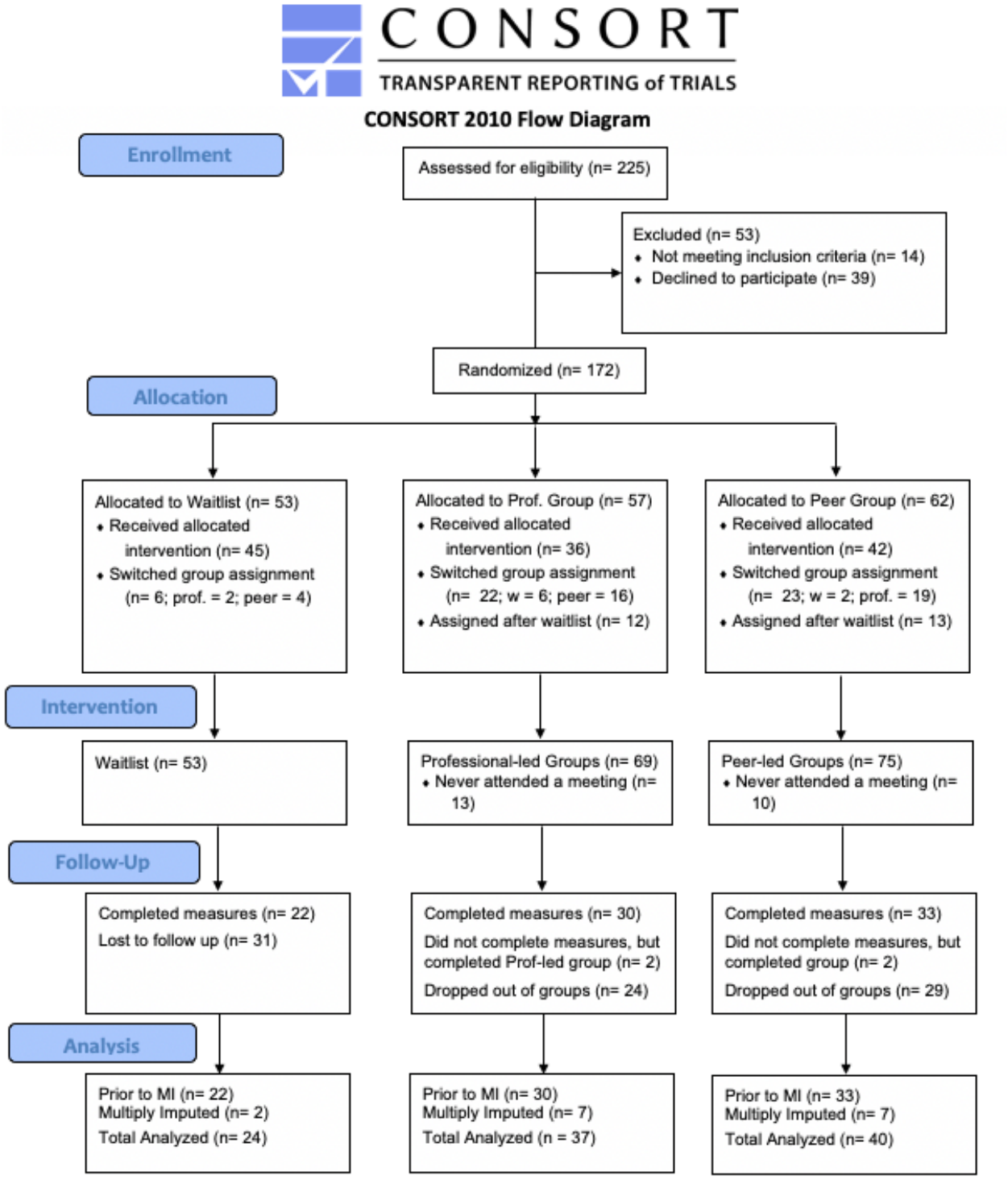


Table 4.1 Demographic Data

	Intervention *(n = 77)*	**Waitlist control** *(n = 25)*
Age	47.04 years (19 – 81 years)	46 years (23 – 80 years)
Sex		
Female	57	21
Male	20	4
Race		
Caucasian	63	18
African-American	3	0
Biracial	3	2
Asian, Asian American	7	3
American Indian/ Alaskan Native	0	0
Native Hawaiian/ Pacific Islander	0	0
Missing	1	1
Education		
< High school	3	0
High School Degree	15	4
Some college, tech	32	11
Advanced Degree	24	9
Missing	13	1

Note. One participant from the waitlist and one participant from the treatment condition declined to enter their race. One participant from the treatment condition declined to enter their education.

Table 4.2 Means and standard deviations of coping skills, outcome variables, and life events by timepoint

	Time 1		Time 2		Change Score (Time 2 – Time 1)	
	mean	*SD*	*mean*	*SD*	*mean*	*SD*
Coping Skills						
Bcope- Support Seeking	19.186	5.589	19.361	5.139	0.145	4.031
Bcope- Approach	16.206	4.201	16.807	4.377	0.530	3.240
Bcope- Disengage	10.314	3.140	10.205	3.087	-0.084	2.165
Bcope- Avoid	18.382	3.800	18.289	3.953	-0.253	3.547
Outcomes						
Anxiety Symptoms	5.216	4.398	4.607	4.613	-0.810	3.829
Depression Symptoms	17.382	7.240	16.167	7.134	-1.202	6.924
Perceived Stress	7.343	5.242	6.447	4.648	-0.988	4.568
Life Events						
Childhood Trauma	43.804	17.849	--	--	--	--
Recent Life Events	4.000	3.366	--	--	--	--
Daily Hassles	41.637	50.440	--	--	--	--

Table 4.3 Correlations between variables at time 1

	1	2	3	4	5	6	7	8	9
1. CTQ Total									
2. Recent life Events	0.222*								
3. Daily Hassles	0.324***	0.41***							
4. Bcope-Support Seeking	-0.193*	-0.058	-0.194*						
5. Bcope-Approach	-0.024	-0.036	-0.16	0.466***					
6. Bcope-Avoid	0.13	0.041	0.075	0.12	0.312***				
7. Bcope-Disengage	0.063	0.111	0.407***	-0.188^{+}	-0.410***	0.022			
8. Anxiety Symptoms	0.116^{+}	0.132	0.479***	-0.029	-0.141	0.029	0.464***		
9.Depression symptoms	0.181	0.205*	0.434***	-0.283**	-0.307**	0.023	0.593***	0.434***	
10.Perceived stress	0.132	0.108	0.536***	-0.355***	-0.453***	-0.134	0.537***	0.553***	0.514***

Note: change = Time 2 score – Time 1 score.
*Correlation significant at the 0.05 level. **Correlation significant at the 0.01 level.
***Correlation significant at the 0.001 level.

Table 4.4 Correlations between variables at time 2

	1	2	3	4	5	6
1. Bcope- Support Seeking						
2. Bcope- Approach	0.44***					
3. Bcope- Avoid	0.15	0.40				
4. Bcope- Disengage	-0.19	-0.43	0.10			
5. Anxiety Symptoms	-0.02	-0.18	0.04	0.49***		
6. Depression symptoms	-0.24*	-0.33	0.10	0.62***	0.50***	
7. Perceived stress	-0.38***	-0.48	-0.06	0.56***	0.56***	0.63***

Note: change = Time 2 score – Time 1 score.
*Correlation significant at the 0.05 level. **Correlation significant at the 0.01 level.
***Correlation significant at the 0.001 level.

Table 4.5 Correlations between life events measures and change scores

	1	2	3	4	5	6	7	8	9
1. Childhood Trauma									
2. Recent life Events	0.22*								
3. Daily Hassles	0.32***	0.41***							
4. Bcope-Support Seeking change	0.00	0.09	0.05						
5. Bcope-Approach change	-0.01	0.04	-0.01	0.47***					
6. Bcope-Avoid change	-0.07	-0.03	0.09	0.39***	0.37***				
7. Bcope-Disengage change	-0.05	-0.13	-0.07	0.05	-0.13	-0.02			
8. Anxiety Symptoms change	0.26*	-0.10	-0.13	-0.26*	-0.17	-0.08	0.31**		
9. Depression symptoms change	-0.01	-0.03	-0.09	-0.16	-0.16	-0.20^{+}	0.51***	0.61***	
10. Perceived stress change	0.06	0.09	-0.12	-0.26*	-0.37***	-0.22*	0.47***	0.56***	0.61***

Note: change = Time 2 score – Time 1 score.
*Correlation significant at the 0.05 level. **Correlation significant at the 0.01 level.
***Correlation significant at the 0.001 level.

Table 4.6 Regression analyses investigating the association between participating in the Mood Lifters™ intervention and changes in anxiety, depression, and perceived stress

	Anxiety Change		*Depression Change*		*Perceived Stress Change*	
	b (SE)	*t (df)*	*b (SE)*	*t (df)*	*b (SE)*	*t (df)*
Model 1a						
Intercept	3.02*** (0.83)	3.65 (80.63)	3.45*** (1.03)	3.36 (72.48)	8.39*** (1.97)	4.25 (84.05)
Condition	-2.76** (0.88)	-3.13 (71.07)	-1.43 (0.99)	-1.44 (74.81)	-2.10 (1.54)	-1.36 (75.58)
Time one levels	-0.31*** (0.08)	-3.72 (80.86)	-0.46*** (0.09)	-5.24 (62.02)	-0.46*** (0.09)	-5.30 (90.09)
Model 1b						
Intercept	1.20 (1.12)	1.07 (84.84)	3.28* (1.33)	2.46 (85.74)	7.28* (3.21)	2.27 (84.85)
Condition	-0.50 (1.31)	-0.38 (79.13)	-1.19 (1.64)	-0.73 (75.56)	-0.61 (3.70)	-0.16 (87.78)
Time one levels	0.09 (0.19)	0.47 (88.00)	-0.43** (0.15)	-2.81 (94.51)	-0.39* (0.17)	-2.27 (86.63)
Time one levels* condition	-0.48* (0.21)	-2.30 (86.43)	-0.03 (0.18)	-0.19 (84.24)	-0.09 (0.20)	-0.44 (89.58)
Model 2a						
Intercept	2.79*** (0.75)	3.70 (75.46)	3.48*** (1.02)	3.40 (61.04)	8.81*** (1.93)	4.55 (82.26)
Total Points	-0.01*** (0.00)	-3.67 (84.32)	0.00 (0.00)	-1.73 (81.53)	-0.01* (0.00)	-1.97 (85.72)
Time one levels	-0.30*** (0.08)	-3.59 (81.27)	-0.46*** (0.09)	-5.37 (62.23)	-0.47*** (0.09)	-5.46 (89.56)
Model 2b						
Intercept	1.68 (1.00)	1.68 (75.16)	3.65** (1.29)	2.84 (67.88)	8.60** (3.06)	2.81 (78.59)
Total Points	0.00 (0.00)	-1.16 (86.16)	-0.01 (0.00)	-1.25 (87.06)	-0.01 (0.01)	-0.72 (86.11)
Time one levels	-0.05 (0.17)	-0.28 (79.13)	-0.49*** (0.14)	-3.38 (75.32)	-0.45** (0.16)	-2.77 (80.64)
Time one levels* Total Points	0.00 (0.00)	-1.73 (86.30)	0.00 (0.00)	0.24 (91.91)	0.00 (0.00)	-0.09 (86.38)

Note: Change for each subscale was calculated as time 2 levels – time 1 levels.
$^{+}$ = trend level (less than or equal to 0.08), * p <0.05, ** p < 0.01, *** p < 0.001

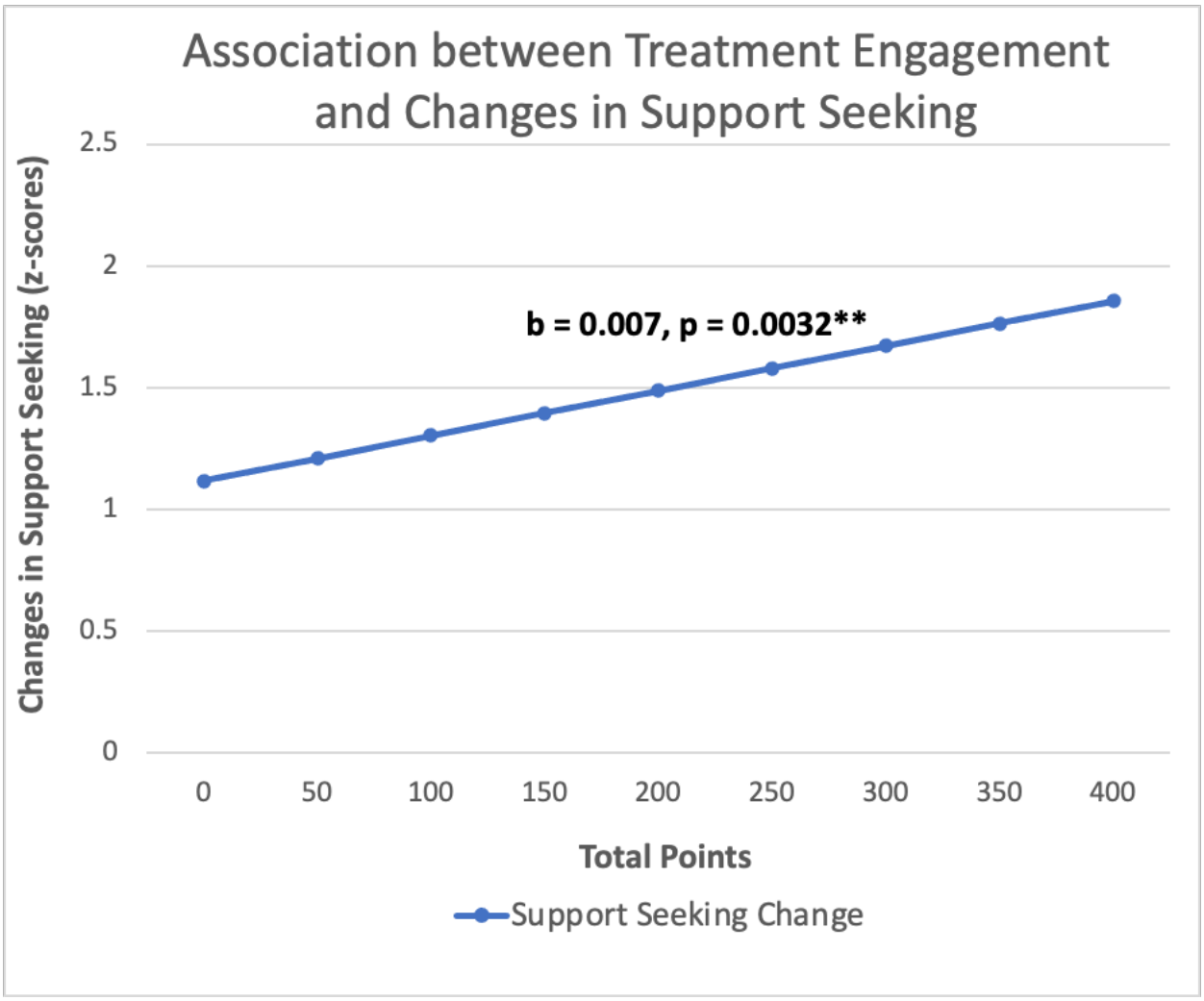
Table 4.7 Regression analyses investigating the association between participating in the Mood Lifters™ intervention and changes in coping skills

	Support Seeking Change		Approach Change		Disengage Change		Avoid Change	
	b (SE)	*t (df)*	*b (SE)*	*t (df))*	*b (SE)*	*t (df)*	*b (SE)*	*t (df)*
Model 1a								
Intercept	4.02* (1.65)	2.43 (74.81)	3.78** (1.40)	2.70 (86.75)	7.03*** (1.87)	3.77 (89.50)	5.26** (1.93)	2.73 (76.67)
Condition	2.67** (0.92)	2.89 (70.95)	1.23 (0.79)	1.55 (73.95)	0.25 (0.53)	0.48 (74.64)	1.48 (0.81)	1.82 (77.55)
Time one levels	-0.31*** (0.07)	-4.28 (68.71)	-0.26** (0.08)	-3.40 (85.00)	-3.19*** (0.79)	-4.05 (87.89)	-0.36*** (0.09)	-3.90 (77.04)
Model 1b								
Intercept	-0.14 (3.38)	-0.04 (56.32)	2.25 (2.40)	0.94 (7.01)	8.13* (3.39)	2.40 (81.90)	3.03 (3.73)	0.81 (92.67)
Condition	7.95* (3.72)	2.13 (58.83)	3.38 (2.86)	1.18 (9.07)	-1.34 (4.04)	-0.33 (83.14)	4.25 (4.20)	1.01 (89.38)
Time one levels	-0.11 (0.16)	-0.67 (51.34)	-0.17 (0.14)	-1.17 (0.12)	-3.67* (1.46)	-2.51 (79.75)	-0.25 (0.19)	-1.30 (93.26)
Time one levels* Condition	-0.26 (0.18)	-1.46 (57.22)	-0.13 (0.17)	-0.78 (0.20)	0.69 (1.75)	0.40 (81.83)	-0.15 (0.22)	-0.67 (89.25)
Model 2a								
Intercept	4.84** (1.56)	3.11 (68.68)	3.76** (1.36)	2.77 (83.55)	7.37*** (1.88)	3.93 (88.90)	5.8**6 (1.89)	3.10 (73.39)
Total Points	0.01** (0.00)	3.04 (80.80)	0.00* (0.00)	2.20 (84.32)	0.00 (0.00)	-0.21 (85.96)	0.00 (0.00)	1.51 (87.15)
Time one levels	-0.34*** (0.07)	-4.68 (67.45)	-0.27*** (0.08)	-3.50 (84.50)	-3.23 (0.79)	-4.08 (88.28)	-0.37*** (0.09)	-4.03 (76.78)
Model 2b								
Intercept	1.71 (2.90)	0.59 (7.53)	2.01 (2.23)	0.90 (84.27)	9.16** (3.08)	2.97 (82.07)	4.15 (3.40)	1.22 (75.49)
Total Points	0.02* (0.01)	2.16 (0.04)	0.01 (0.01)	1.56 (91.07)	-0.01 (0.01)	-0.79 (87.40)	0.01 (0.01)	0.91 (88.20)
Time one levels	-0.18 (0.14)	-1.25 (0.11)	-0.16 (0.13)	-1.20 (82.84)	-4.01** (1.33)	-3.01 (80.73)	-0.28 (0.17)	-1.64 (77.87)
Time one levels* Total Points	0.00 (0.00)	-1.39 (0.00)	0.00 (0.00)	-1.01 (90.52)	0.00 (0.00)	0.76 (86.27)	0.00 (0.00)	-0.64 (89.34)

Note: Change for each subscale was calculated as time 2 levels – time 1 levels.

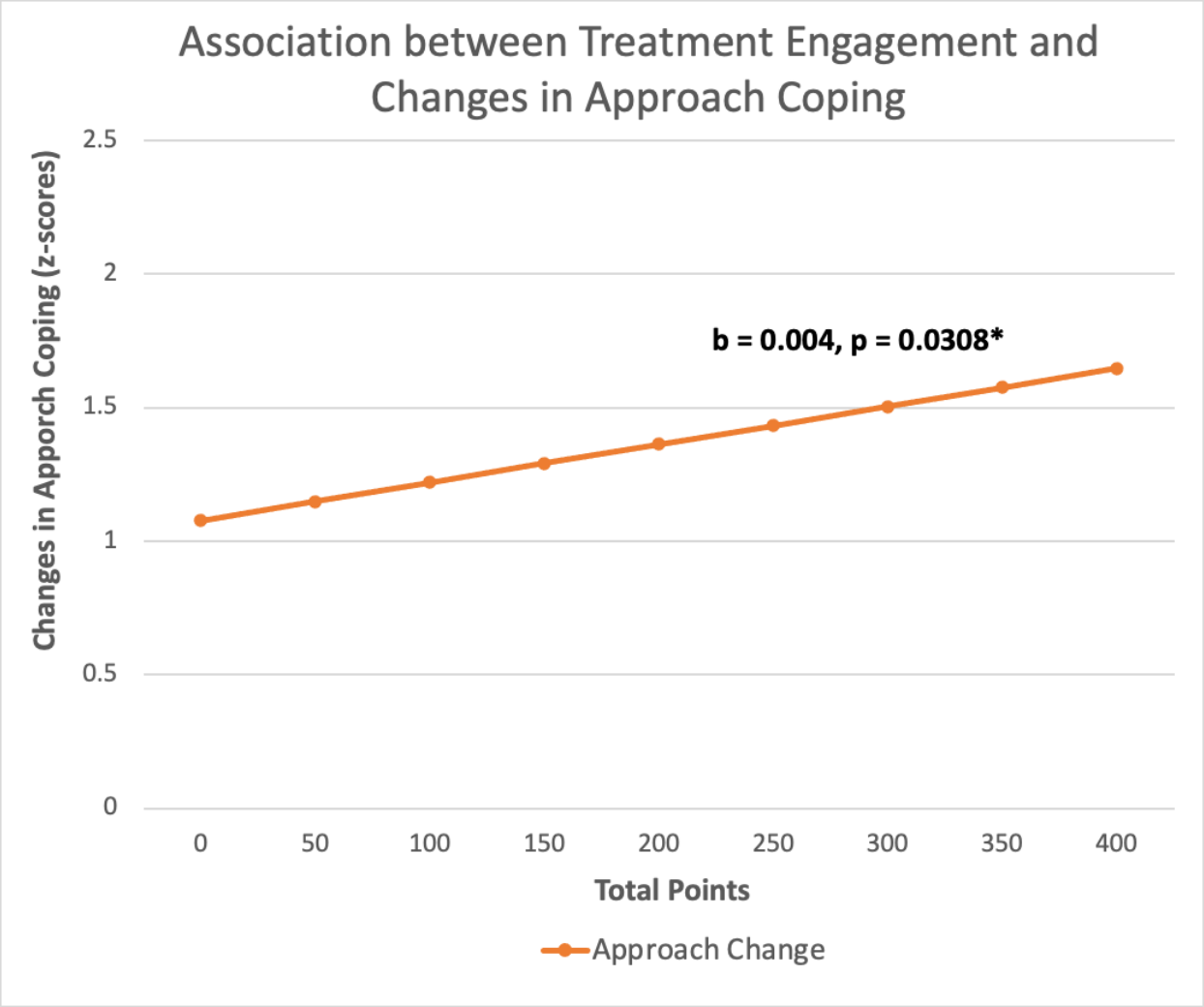
$^{+}$ = trend level (less than or equal to 0.08), * p <0.05, ** p < 0.01, *** p < 0.001

Figure 4.2 Association between Treatment Engagement and Changes in Support Seeking



*Note: Change in coping skills was calculated as time 2 - time 1, so positive change scores suggest greater use of the coping skills reported in that category at time 2 compared to time 1.

Figure 4.3 Association between Treatment Engagement and Changes in Approach Coping



*Note: Change in coping skills was calculated as time 2 - time 1, so positive change scores suggest greater use of the coping skills reported in that category at time 2 compared to time 1.

Table 4.8 Regression analyses investigating the association between changes in coping skills and changes in anxiety, depression, and perceived stress

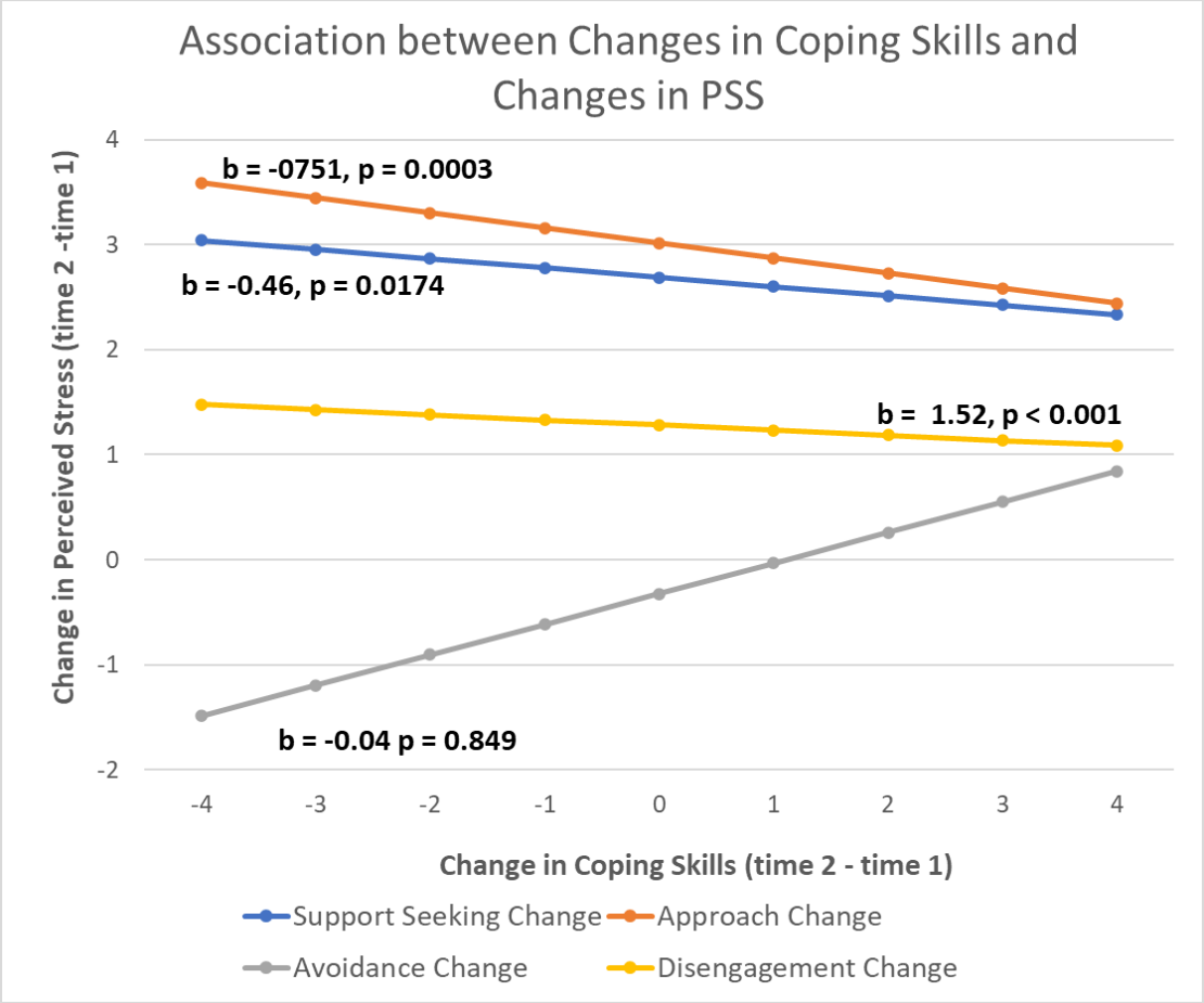
	Anxiety Change		Depression Change		Perceived Stress Change	
	b (SE)	*t (df)*	*b (SE)*	*t (df))*	*b (SE)*	*t (df)*
Model 1a						
Intercept	1.94 (1.63)	1.19 (71.55)	4.65* (2.10)	2.21 (65.17)	14.98*** (3.47)	4.32 (77.76)
Support Seeking Time One levels	-0.05 (0.08)	-0.67 (71.28)	-0.11 (0.09)	-1.18 (68.58)	-0.37** (0.14)	-2.74 (71.94)
Support Seeking Change	-0.22^{+} (0.12)	-1.92 (60.20)	-0.14 (0.13)	-1.06 (59.34)	-0.46* (0.19)	-2.45 (58.11)
Outcome time 1 levels	-0.30*** (0.09)	-3.49 (79.85)	-0.48*** (0.09)	-5.36 (-65.21)	-0.51*** (0.09)	-5.86 (91.86)
Model 1b						
Intercept	2.22 (1.66)	1.34 (69.99)	4.78* (2.10)	2.28 (63.80)	14.80*** (3.49)	4.24 (78.86)
Support Seeking Time one levels	-0.07 (0.08)	-0.81 (68.91)	-0.11 (0.09)	-1.24 (66.69)	-0.37** (0.14)	-2.72 (71.99)
Support Seeking Change	-0.10 (0.17)	-0.61 (62.29)	0.07 (0.21)	0.35 (63.85)	-0.32 (0.43)	-0.74 (78.06)
Outcome time 1 levels	-0.30*** (0.09)	-3.47 (79.86)	-0.47*** (0.09)	-5.34 (66.34)	-0.50*** (0.09)	-5.39 (89.22)
Support Seeking Change*Outcome time 1 levels	-0.02 (0.02)	-0.98 (71.51)	-0.03 (0.02)	-1.21 (60.67)	-0.01 (0.02)	-0.38 (80.89)
Model 2a						
Intercept	2.28 (1.80)	1.27 (75.92)	5.39* (2.19)	2.46 (72.14)	16.86*** (3.74)	4.50 (81.54)
Approach Time one levels	-0.06 (0.10)	-0.66 (79.15)	-0.16 (0.11)	-1.44 (78.78)	-0.51** (0.17)	-3.07 (82.34)
Approach Change	-0.26^{+} (0.13)	-1.91 (60.06)	-0.25 (0.15)	-1.63 (52.23)	-0.75*** (0.20)	-3.78 (73.26)
Outcome time 1 levels	-0.35*** (0.09)	-3.99 (82.55)	-0.50*** (0.09)	-5.55 (63.97)	-0.54*** (0.09)	-6.06 (87.72)
Model 2b						
Intercept	2.18 (1.83)	1.19 (74.93)	5.49* (2.19)	2.51 (74.00)	17.63*** (3.81)	4.63 (77.97)
Approach Time one levels	-0.06 (0.10)	-0.58 (77.33)	-0.17 (0.11)	-1.49 (79.38)	-0.56** (0.17)	-3.27 (78.03)
Approach Change	-0.32 (0.21)	-1.49 (63.56)	-0.17 (0.27)	-0.63 (52.86)	-0.10 (0.49)	-0.21 (86.12)
Outcome time 1 levels	-0.35*** (0.09)	-4.01 (83.28)	-0.50*** (0.09)	-5.58 (65.44)	-0.53*** (0.09)	-5.91 (86.19)

Approach Change* Outcome time 1 levels	0.01 (0.03)	0.37 (72.34)	-0.01 (0.03)	-0.38 (61.93)	-0.04 (0.03)	-1.41 (84.40)
Model 3a						
Intercept	-4.16 (3.59)	-1.16 (83.73)	-8.36* (3.65)	-2.29 (83.95)	-8.38 (5.32)	-1.57 (84.97)
Disengage Time one levels	2.44 (1.66)	1.47 (82.99)	4.92** (1.73)	2.84 (82.58)	7.22** (2.60)	2.77 (83.86)
Disengage Change	0.61*** (0.19)	3.27 (73.81)	0.97*** (0.19)	5.06 (63.88)	1.53*** (0.29)	5.25 (69.83)
Outcome time 1 levels	-0.39*** (0.10)	-4.12 (80.47)	-0.52*** (0.09)	-5.53 (61.96)	-0.53*** (0.09)	-5.86 (87.05)
Model 3b						
Intercept	-3.93 (3.62)	-1.09 (83.86)	-8.51* (3.72)	-2.29 (82.01)	-8.36 (5.49)	4.63 (83.98)
Disengage Time one levels	2.33 (1.67)	1.39 (83.13)	4.98** (1.76)	2.84 (81.14)	7.21** (2.68)	-3.27 (82.64)
Disengage Change	0.71* (0.27)	2.60 (75.50)	0.91** (0.32)	2.88 (62.92)	1.52* (0.76)	-0.21 (81.27)
Outcome time 1 levels	-0.39*** (0.10)	-4.06 (80.10)	-0.51*** (0.09)	-5.42 (67.16)	-0.53*** (0.09)	-5.91 (86.40)
Approach Change* Outcome time 1 levels	-0.02 (0.03)	-0.48 (84.44)	0.01 (0.03)	0.25 (69.42)	0.00 (0.04)	-1.41 (82.86)
Model 4a						
Intercept	2.01 (2.19)	0.92 (71.78)	0.41 (2.50)	0.17 (62.04)	7.21^{+} (4.06)	1.78 (76.16)
Avoid Time one levels	-0.05 (0.12)	-0.47 (73.34)	0.11 (0.13)	0.85 (71.29)	-0.04 (0.19)	-0.19 (74.44)
Avoid Change	-0.05 (0.13)	-0.38 (70.95)	-0.04 (0.15)	-0.29 (59.07)	-0.26 (0.22)	-1.15 (60.90)
Outcome time 1 levels	-0.33*** (0.09)	-3.74 (83.97)	-0.46*** (0.09)	-5.26 (64.62)	-0.44*** (0.09)	-5.04 (89.21)
Model 4b						
Intercept	2.02 (2.20)	0.92 (71.13)	0.37 (2.51)	0.15 (62.50)	7.17^{+} (4.02)	1.79 (74.34)
Avoid Time one levels	-0.06 (0.12)	-0.49 (72.82)	0.11 (0.13)	0.88 (71.65)	-0.04 (0.19)	-0.21 (73.00)
Avoid Change	-0.14 (0.19)	-0.73 (69.76)	0.01 (0.24)	0.06 (65.85)	0.60 (0.50)	1.19 (82.43)
Outcome time 1 levels	-0.33*** (0.09)	-3.71 (83.75)	-0.46*** (0.09)	-5.22 (64.76)	-0.43*** (0.09)	-4.89 (87.23)
Avoid Change* Outcome time 1 levels	0.01 (0.02)	0.66 (78.83)	-0.01 (0.02)	-0.29 (66.24)	-0.05^{+} (0.03)	-1.87 (84.78)

Note: Change for each subscale was calculated as time 2 levels – time 2 levels.

$^{+}$ = trend level (less than or equal to 0.08), * p <0.05, ** p < 0.01, *** p < 0.001

Figure 4.4 Association between Changes in Coping Skills and Changes in Perceived Stress from time 1 to time 2



*Note negative change scores reflect greater scores at time 2 compared to time 1.
For example, greater support seeking at time 2 compared to time 1 (x value = 4) was associated with time 2 – time 1 perceived stress value equal to 2. In contrast, lower support seeking at time 2 compared to time 1 (x value = - 4) was associated with time 2 – time 1 perceived stress equal to 3.5. So increases in support seeking from time 1 to time 2 are associated with decreases in perceived stress from time 1 to time 2.

Table 4.9 Regression analyses investigating the impact of life events on the association between participating in the Mood Lifters™ intervention and changes in coping skills

	Support Seeking Change		Approach Change		Disengage Change		Avoid Change	
	b (SE)	*t (df)*	*b (SE)*	*t (df))*	*b (SE)*	*t (df)*	*b (SE)*	*t (df)*
Model 1a								
Intercept	3.55+ (2.13)	1.67 (78.68)	3.19 (1.71)	1.86 (83.64)	7.74*** (2.11)	3.66 (86.37)	4.82 (2.1)	7.36 (9.01)
Condition	2.71*** (0.94)	2.88 (69.58)	1.26 (0.81)	1.56 (72.72)	0.27 (0.54)	0.5 (73.8)	1.59 (0.82)	2.21 (3.22)
Time one levels	-0.31 (0.07)	-4.20 (71.78)	-0.26 (0.08)	-3.36 (85.85)	-3.48*** (0.9)	-3.88 (83.57)	-0.37 (0.09)	-0.3 (-0.18)
Daily Hassles	0.00 (0.02)	0.07 (90.85)	-0.01 (0.01)	-0.46 (89.48)	0.01 (0.01)	0.85 (88.21)	0.02 (0.01)	0.03 (0.05)
Childhood Trauma	-0.01 (0.02)	-0.24 (75.28)	0.01 (0.02)	0.3 (74.19)	0 (0.01)	-0.21 (73.16)	0 (0.02)	0.02 (0.04)
Recent Life Events	0.15 (0.13)	1.13 (74.11)	0.11 (0.12)	0.94 (69.21)	-0.04 (0.07)	-0.57 (78.87)	-0.09 (0.12)	0.02 (0.14)
Model 1b								
Intercept	1.13 (4.20)	0.27 (73.97)	2.61 (2.86)	0.91 (89.02)	8.45** (4.2)	2.01 (85.78)	3.65 (3.91)	0.93 (92.74)
Condition	6.11*** (4.67)	1.31 (76.15)	2.10 (3.42)	0.62 (89.04)	-1.11 (4.85)	-0.23 (85.9)	2.71 (4.43)	0.61 (89.76)
Time one levels	-0.13 (0.17)	-0.79 (57.23)	-0.15 (0.15)	-1.02 (88.41)	-4.18** (1.78)	-2.34 (79.33)	-0.19 (0.2)	-0.97 (94.37)
Daily Hassles	0.03 (0.03)	0.85 (91.36)	0.00 (0.03)	0.09 (95.324)	0.02 (0.02)	1.11 (89.58)	0.05+ (0.03)	1.88 (95.43)
Childhood Trauma	-0.04 (0.04)	-0.91 (83.94)	-0.02 (0.03)	-0.6 (86.79)	0.01 (0.02)	0.62 (91.79)	-0.04 (0.04)	-1.03 (88.19)
Recent Life Events	0.02 (0.26)	0.08 (91.24)	0.07 (0.23)	0.29 (86.74)	-0.11 (0.15)	-0.76 (88.81)	-0.32 (0.23)	-1.37 (84.92)
Time 1 Levels* Condition	-0.24 (0.19)	-1.31 (63.32)	-0.15 (0.17)	-0.84 (88.96)	1.13 (2.06)	0.55 (82.23)	-0.21 (0.23)	-0.93 (91.14)
Daily Hassles* Condition	-0.04 (0.04)	-1.23 (89.47)	-0.02 (0.03)	-0.5 (91.56)	-0.02 (0.02)	-0.72 (89.55)	-0.03 (0.03)	-1.06 (92.99)
Childhood Trauma* Condition	0.04 (0.05)	0.93 (80.41)	0.04 (0.04)	0.89 (82.92)	-0.03 (0.03)	-0.89 (85.97)	0.06 (0.04)	1.3 (84.35)
Recent Life Events* Condition	0.19 (0.30)	0.64 (87.84)	0.05 (0.26)	0.21 (85.61)	0.1 (0.17)	0.56 (84.17)	0.3 (0.26)	1.12 (84.66)
Model 2a								
Intercept	4.57* (2.00)	2.29 (77.47)	3.18 (1.65)	1.92 (82.61)	8.06*** (2.1)	3.84 (88.66)	5.44** (2.04)	2.67 (71.73)

Total Points	0.01*** (0.00)	2.97 (79.72)	0.00 (0.00)	2.15 (83.25)	0 (0)	-0.17 (84.98)	0 (0)	1.71 (87.32)
Time one levels	-0.33 (0.07)	-4.63 (70.59)	-0.27 (0.08)	-3.46 (85.43)	-3.5** (0.9)	-3.89 (84.32)	-0.38*** (0.09)	-4.1 (76.63)
Daily Hassles	0.00 (0.02)	0.12 (89.24)	-0.01 (0.01)	-0.37 (87.51)	0.01 (0.01)	0.8 (86.76)	0.03 (0.01)	1.75 (93.46)
Childhood Trauma	-0.01 (0.02)	-0.31 (77.66)	0.01 (0.02)	0.35 (76.1)	0 (0.01)	-0.26 (74.8)	0 (0.02)	0.22 (76.49)
Recent Life Events	0.13 (0.13)	0.98 (74.99)	0.10 (0.12)	0.85 (69.92)	-0.04 (0.07)	-0.57 (79.8)	-0.1 (0.12)	-0.86 (72.82)
Model 2b								
Intercept	3.74 (3.60)	1.04 (71.77)	2.47 (2.72)	0.91 (82.77)	9.8** (3.89)	2.52 (81.82)	4.59 (3.52)	1.3 (75.69)
Total Points	0.01*** (0.01)	0.95 (82.32)	0.01 (0.01)	0.83 (90.00)	-0.01 (0.01)	-0.65 (87.7)	0.01 (0.01)	0.56 (89.42)
Time one levels	-0.22 (0.15)	-1.54 (56.02)	-0.15 (0.14)	-1.13 (84.47)	-4.55* (1.65)	-2.75 (76.32)	-0.26 (0.18)	-1.46 (76.05)
Daily Hassles	0.03 (0.03)	1.32 (91.68)	0.01 (0.02)	0.48 (93.75)	0.02 (0.02)	1.16 (85.05)	0.06** (0.02)	2.74 (94.59)
Childhood Trauma	-0.04 (0.04)	-1.08 (74.79)	-0.02 (0.03)	-0.74 (71.47)	0.01 (0.02)	0.58 (73.82)	-0.03 (0.03)	-0.91 (71.12)
Recent Life Events	-0.08 (0.24)	-0.34 (80.67)	0.05 (0.21)	0.26 (77.60)	-0.16 (0.14)	-1.14 (85.28)	-0.35 (0.21)	-1.65 (76.67)
Time 1 Levels* Total Points	0.00 (0.00)	-1.12 (68.16)	-0.00 (0.00)	-1.1 (91.12)	0 (0.01)	0.89 (84.62)	0 (0)	-0.9 (88.1)
Daily Hassles* Total Points	0.00 (0.00)	-1.81 (91.01)	-0.00 (0.00)	-1.16 (94.25)	0 (0)	-0.61 (92.05)	0** (0)	-2.19 (93.71)
Childhood Trauma* Total Points	0.00 (0.00)	1.37 (88.03)	0.00 (0.00)	1.44 (84.80)	0 (0)	-1.12 (89.03)	0 (0)	1.6 (85.71)
Recent Life Events* Total Points	0.00 (0.00)	1.10 (90.27)	0.00 (0.00)	0.21 (89.81)	0 (0)	1.01 (90.84)	0 (0)	1.34 (89.08)

Note: Change for each subscale was calculated as time 2 levels – time 2 levels.

$^{+}$ = trend level (less than or equal to 0.08), * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.10 Regression analyses investigating the impact of life events on the association between changes in coping skills and changes in anxiety, depression, and perceived stress

	Depression Change		Anxiety Change		Perceived Stress Change	
	b (SE)	*t (df)*	*b (SE)*	*t (df))*	*b (SE)*	*t (df)*
Model 1a						
Intercept	4.56^{+} (2.39)	1.91 (74.36)	-1.17 (1.88)	-0.62 (74.7)	14.6*** (3.83)	3.82 (80.27)
Time one levels	-0.53*** (0.1)	-5.44 (66.45)	-0.41*** (0.09)	-4.43 (77.54)	-0.61*** (0.09)	-6.55 (90.85)
Time one Support Seeking	-0.11 (0.09)	-1.25 (72.2)	0 (0.08)	0.01 (68.44)	-0.39** (0.13)	-2.93 (72.25)
Change in Support Seeking	-0.14 (0.13)	-1.12 (64.24)	-0.17 (0.11)	-1.57 (58.34)	-0.48* (0.18)	-2.59 (58.32)
Daily Hassles	0.02 (0.02)	1.17 (91.3)	0.04* (0.02)	2.21 (94.02)	0.06* (0.03)	2.21 (91.82)
Childhood Trauma	0 (0.02)	-0.19 (81.32)	0.06** (0.02)	2.91 (83.01)	0.01 (0.03)	0.18 (82.19)
Recent Life Events	0.04 (0.14)	0.27 (74.76)	-0.24* (0.12)	-2.03 (80.33)	0.14 (0.2)	0.71 (86.5)
Model 1b						
Intercept	4.09 (2.46)	1.66 (74.96)	-1.01 (1.97)	-0.52 (72.05)	13.56*** (4)	3.39 (80.23)
Time one levels	-0.48*** (0.1)	-4.63 (61.29)	-0.41*** (0.09)	-4.43 (78.17)	-0.59*** (0.1)	-5.86 (87.71)
Time one Support Seeking	-0.11 (0.09)	-1.18 (72.12)	-0.02 (0.08)	-0.19 (65.26)	-0.37* (0.14)	-2.63 (73.17)
Change in Support Seeking	0.26 (0.37)	0.7 (64.86)	0.23 (0.29)	0.78 (62.45)	-0.17 (0.55)	-0.32 (76.72)
Daily Hassles	0.02 (0.02)	0.78 (84.05)	0.03* (0.02)	1.98 (92.27)	0.05 (0.03)	1.76 (90.1)
Childhood Trauma	0.01 (0.03)	0.27 (78.82)	0.07** (0.02)	3.1 (82.17)	0.02 (0.04)	0.42 (84.65)
Recent Life Events	0 (0.15)	0.01 (73.26)	-0.25* (0.12)	-2.05 (81.13)	0.17 (0.2)	0.85 (86.18)
Time one levels*Change in support seeking	-0.03 (0.03)	-1.23 (53.77)	-0.02 (0.03)	-0.68 (74.22)	-0.01 (0.02)	-0.6 (83.08)
Daily Hassles*Change in Support Seeking	0 (0.01)	0.66 (74.97)	0 (0)	0.14 (90.58)	0.01 (0.01)	1.1 (91.06)
Childhood Trauma*Change in Support Seeking	-0.01 (0.01)	-0.89 (63.14)	-0.01 (0.01)	-1.55 (67.54)	-0.01 (0.01)	-0.51 (75.8)
Recent Life Events* Change in Support	0.02 (0.04)	0.44 (76.63)	0.02 (0.03)	0.69 (73.04)	-0.01 (0.05)	-0.13 (78.95)

Seeking						
Model 2a						
Intercept	5.23* (2.34)	2.23 (76.13)	0.35 (1.85)	0.19 (78)	17.24*** (3.89)	4.43 (79.53)
Time one levels	-0.55*** (0.1)	-5.68 (66.39)	-0.44*** (0.09)	-4.94 (80.35)	-0.68*** (0.1)	-6.93 (83.83)
Time one Approach	-0.18 (0.11)	-1.61 (79.41)	-0.08 (0.09)	-0.83 (77.07)	-0.6*** (0.16)	-3.7 (79.18)
Change in Approach	-0.26 (0.15)	-1.73 (58.06)	-0.25^{+} (0.13)	-1.97 (59.21)	-0.76*** (0.19)	-3.98 (72.64)
Daily Hassles	0.02 (0.02)	1.24 (92.4)	0.04* (0.02)	2.27 (94.33)	0.07* (0.03)	2.48 (90.09)
Childhood Trauma	0 (0.02)	0.08 (75.62)	0.06** (0.02)	2.95 (79.71)	0.03 (0.03)	0.81 (78.03)
Recent Life Events	0.04 (0.14)	0.31 (74.83)	-0.25* (0.12)	-2.09 (81.76)	0.13 (0.19)	0.68 (83.65)
Model 2b						
Intercept	3.82 (2.44)	1.56 (76.04)	-0.3 (1.89)	-0.16 (75.64)	17.34*** (4)	4.33 (72.22)
Time one levels	-0.5*** (0.1)	-4.88 (63.64)	-0.45*** (0.09)	-5.05 (81.11)	-0.67*** (0.1)	-6.95 (80.1)
Time one Approach	-0.14 (0.11)	-1.25 (81.66)	-0.08 (0.09)	-0.82 (75.64)	-0.64*** (0.17)	-3.83 (73.02)
Change in Approach	0.15 (0.39)	0.37 (62.55)	0.08 (0.32)	0.26 (63.54)	0.54 (0.6)	0.9 (77.2)
Daily Hassles	0.02 (0.02)	0.88 (90.1)	0.04* (0.02)	2.51 (93.4)	0.07* (0.03)	2.53 (88.46)
Childhood Trauma	0.02 (0.03)	0.59 (68.46)	0.08*** (0.02)	3.33 (65.39)	0.04 (0.04)	1.16 (66.33)
Recent Life Events	0.04 (0.15)	0.26 (71.48)	-0.29* (0.13)	-2.27 (75.78)	0.12 (0.2)	0.63 (78.43)
Time one levels*Change in Approach	-0.02 (0.03)	-0.71 (61.85)	0 (0.03)	0.13 (66.01)	-0.06* (0.03)	-2.12 (77.4)
Daily Hassles*Change in Approach	0.01 (0.01)	1.38 (79.39)	0 (0.01)	0.15 (91.64)	0.02* (0.01)	2.06 (89.2)
Childhood Trauma* Change in Approach	-0.01 (0.01)	-1.55 (65.68)	-0.01* (0.01)	-1.99 (67.8)	-0.01 (0.01)	-1.43 (79.11)
Recent Life Events* Change in Approach	0 (0.04)	0.12 (82.88)	0.04 (0.04)	1.12 (79.88)	-0.03 (0.06)	-0.49 (79.75)
Model 3a						
Intercept	-8.44* (4.04)	-2.09 (82.13)	-4.81 (3.6)	-1.34 (80.82)	-7.48 (5.65)	-1.32 (84.13)
Time one levels	-0.54*** (0.1)	-5.68 (65.83)	-0.47*** (0.09)	-5.16 (79.83)	-0.58*** (0.09)	-6.48 (87.68)

Time one Disengage	4.71* (1.84)	2.56 (81.32)	1.73 (1.61)	1.07 (79.38)	5.91* (2.65)	2.23 (82.73)
Change in Disengage	0.97*** (0.19)	5.06 (66.74)	0.61*** (0.18)	3.42 (66.12)	1.52*** (0.29)	5.29 (67.36)
Daily Hassles	0.01 (0.02)	0.54 (87.74)	0.04* (0.02)	2.35 (93.75)	0.05 (0.03)	1.73 (91.23)
Childhood Trauma	0 (0.02)	0.23 (75.49)	0.06** (0.02)	3.19 (82.16)	0.03 (0.03)	0.91 (82.67)
Recent Life Events	0.07 (0.13)	0.56 (70.52)	-0.25* (0.11)	-2.22 (79.26)	0.15 (0.18)	0.81 (79.78)
Model 3b						
Intercept	-9.19* (4.21)	-2.18 (78.03)	-5.13 (3.74)	-1.37 (76.59)	-8.17 (6.06)	-1.35 (81.46)
Time one levels	-0.54*** (0.1)	-5.58 (70.2)	-0.48*** (0.09)	-5.09 (79.13)	-0.57*** (0.09)	-6.18 (87.63)
Time one Disengage	5.09** (1.89)	2.69 (77.98)	2.01 (1.64)	1.23 (77.24)	6.1* (2.8)	2.18 (79.35)
Change in Disengage	0.8 (0.58)	1.37 (61.25)	0.32 (0.57)	0.57 (57.97)	1.23 (0.96)	1.28 (78.44)
Daily Hassles	0 (0.02)	0.07 (82.69)	0.02 (0.02)	1.32 (88.73)	0.04** (0.03)	1.43 (84.01)
Childhood Trauma	0.01 (0.02)	0.39 (76.59)	0.06** (0.02)	3.03 (74.41)	0.03* (0.03)	0.98 (84.73)
Recent Life Events	0.05 (0.13)	0.36 (67.82)	-0.25* (0.12)	-2.1 (74.15)	0.14 (0.2)	0.74 (78.2)
Time one levels*Change in Disengage	0.03 (0.04)	0.83 (67.79)	0.02 (0.03)	0.44 (78.57)	0.02 (0.04)	0.5 (84.52)
Daily Hassles X Change in Disengage	-0.01 (0.01)	-1.51 (79.8)	-0.01 (0.01)	-1.12 (86.42)	-0.01 (0.01)	-0.52 (84.34)
Childhood Trauma* Change in Disengage	0 (0.01)	0.33 (54.46)	0.02 (0.01)	1.36 (56.95)	0* (0.02)	-0.25 (62.73)
Recent Life Events* Change in Disengage	0.03 (0.06)	0.52 (77.95)	-0.06 (0.06)	-1.03 (73.51)	0.08 (0.09)	0.82 (82.12)
Model 4a						
Intercept	0.4 (2.63)	0.15 (63.14)	0.96 (2.16)	0.45 (70.11)	7.72^{+} (4.19)	1.84 (74.56)
Time one levels	-0.51*** (0.1)	-5.3 (65.58)	-0.43*** (0.09)	-4.71 (81.17)	-0.55*** (0.1)	-5.79 (88.72)
Time one Avoid	0.1 (0.13)	0.75 (69.6)	-0.11 (0.11)	-1.01 (67.01)	-0.13 (0.19)	-0.66 (73.51)
Change in Avoid	-0.05 (0.15)	-0.36 (60.9)	-0.09 (0.12)	-0.77 (65.67)	-0.31 (0.22)	-1.42 (64.12)
Daily Hassles	0.02 (0.02)	1.17 (91.48)	0.04* (0.02)	2.4 (93.71)	0.06* (0.03)	2.19 (92.74)

Childhood Trauma	0 (0.03)	-0.12 (74.47)	0.06** (0.02)	2.91 (78.81)	0.02 (0.04)	0.62 (77.62)
Recent Life Events	0.01 (0.15)	0.09 (71.86)	-0.28* (0.12)	-2.29 (77.91)	0.06 (0.21)	0.26 (81.7)
Model 4b						
Intercept	0.75 (2.65)	0.28 (63.89)	1.35 (2.17)	0.62 (67.84)	8.31^{+} (4.21)	1.97 (71.3)
Time one levels	-0.46*** (0.1)	-4.45 (58.77)	-0.42*** (0.09)	-4.64 (79.01)	-0.52*** (0.09)	-5.51 (87.7)
Time one Avoid	0.06 (0.13)	0.46 (69.02)	-0.14 (0.11)	-1.24 (63.79)	-0.19 (0.2)	-0.96 (70.67)
Change in Avoid	0.44 (0.4)	1.1 (61.96)	0.31 (0.35)	0.89 (63.05)	1.11 (0.62)	1.8 (81.55)
Daily Hassles	0.02 (0.02)	0.93 (89.33)	0.04* (0.02)	2.51 (91.87)	0.06^{+} (0.03)	1.92 (91.94)
Childhood Trauma	0 (0.03)	0.1 (71.87)	0.07** (0.02)	3 (72.4)	0.04 (0.04)	0.99 (75.54)
Recent Life Events	-0.03 (0.15)	-0.18 (67.63)	-0.31* (0.12)	-2.52 (75.6)	-0.02 (0.22)	-0.08 (77.72)
Time one levels*Change in Avoid	-0.01 (0.03)	-0.42 (60.88)	0 (0.02)	0.15 (72.36)	-0.06* (0.03)	-1.99 (82.83)
Daily Hassles*Change in Avoid	0 (0.01)	0.3 (85.77)	0 (0.01)	-0.53 (93.35)	0.01 (0.01)	0.92 (87.38)
Childhood Trauma* Change in Avoid	-0.01 (0.01)	-1.74 (74.13)	-0.01* (0.01)	-2.03 (80.88)	-0.01 (0.01)	-1.4 (84.12)
Recent Life Events* Change in Avoid	0.01 (0.04)	0.24 (73.17)	0.03 (0.04)	0.88 (69.07)	-0.01 (0.06)	-0.21 (77.8)

Note: Change for each subscale was calculated as time 2 levels – time 2 levels.

$^{+}$ = trend level (less than or equal to 0.08), * p <0.05, ** p < 0.01, *** p < 0.001

Chapter 5 Summary and Conclusions

Stress exposure increases risk for negative mental health outcomes (Asselmann, Wittchen, Lieb, & Beesdo-Baum, 2017; Kraaij, Arensman, & Spinhoven, 2002; Spinhoven et al., 2010; Staufenbiel, Penninx, Spijker, Elzinga, & van Rossum, 2013; Tennant, 2002); however, not all individuals develop psychopathology when exposed to stress (Bonanno, Westphal, & Mancini, 2011). Therefore, resilience is possible. This dissertation aimed to examine factors associated with resilience across the lifespan and examined whether novel, skills-based interventions may bolster factors associated with resilience and improve psychological well-being among stress exposed children and adults. Overall, we found significant evidence that social support and mastery help mitigate the effects of stress on adolescent mental health but the protective effects of these factors may vary based on gender. We also found evidence for the effectiveness of the Kids' Empowerment Program and Mood Lifters^{TM} on improve coping skills and the use of and perception of social support for school-aged children and adults. Further, changes in these resilience factors may provide a mechanism by which these interventions promote well-being. These findings suggest that not only is resilience possible, but factors associated with resilience are modifiable and teachable. These observations have important implications for our understanding of resiliency and provide guidelines for bolstering the likelihood of resilience among across the lifespan.

Study One

The transition to adolescence is marked by significant increases in stress exposure and greater rates of internalizing psychopathology (LeMoult et al., 2020; Michl, McLaughlin, Shepherd, & Nolen-Hoeksema, 2013; Spinhoven et al., 2010; Stikkelbroek, Bodden, Kleinjan, Reijnders, & van Baar, 2016). Studies of resilient adolescents have found that increased feelings of social support and mastery are associated with decreased anxiety and depression (Bovier, Chamot, & Perneger, 2004; Chu, Saucier, & Hafner, 2010; Southwick et al., 2016). Further, these factors may influence an adolescent's stress sensitivity, that is, their likelihood to experience negative affect or distress when confronted with a stressful event, which may influence risk for negative mental health outcomes when confronted with stressful events (Bale, 2006). Therefore, study one sought to investigate the impact of social support, mastery, stress exposure and stress sensitivity on adolescent symptoms of anxiety and depression. 117 adolescents ages 12 to 16 years and their parents completed self-report ratings of social support, feelings of mastery, and symptoms of anxiety and depression. In addition, adolescents identified negative life events experienced in the past year and provided subjective ratings of stress for each life event. Adolescents and their parents participated in a semi-structured contextual life stress interview (Williamson et al., 2003) in which researchers gathered information about the context surrounding each life event and assigned a consensus measure of stress severity using a standardized set of ratings. Discrepancies between total subjective stress and total consensus stress were calculated to assess stress reactivity, in which high stress reactivity was indicated by greater subjective compared to consensus ratings of stress.

As hypothesized, we found that feelings of mastery were associated with reduced anxiety and depression in stress-exposed youth (Aim 1). While greater social support was associated with

reduced depression as predicted, social support was not significantly related to anxiety. Contrary to hypotheses, social support was not related to stress sensitivity. Greater mastery was related to reduced stress sensitivity (i.e. reduced subjective compared to consensus stress ratings) at trend level. Additionally, we observed significant gender differences in which greater social support was associated with reduced subjective stress and consensus stress for males but with greater subjective stress and stress sensitivity for females. Finally, we found that greater subjective and consensus stress ratings as well as greater stress sensitivity were related to greater symptoms of anxiety and depression. These findings suggest that social support, mastery, and stress sensitivity have important implications for the likelihood of resilience in the context of greater stress exposure. However, given the similar findings for the stress sensitivity and subjective stress, stress sensitivity may not provide significant information above what is measured by perceptions of stress. Further, the protective effect of social support and mastery may vary based on gender. Adolescent females value interpersonal relationships more strongly than males and are more likely to utilize their social support networks for coping (Belle, Burr, & Cooney, 1987; Rueger, Malecki, & Demaray, 2010). Thus, when interpersonal conflicts arise, females may experience greater distress and exhibit more negative mental health outcomes. Furthermore, gender differences in what personal traits are valued may increase the likelihood of mastery among males, whereas females may be more likely to experience feelings of powerlessness and learned helplessness (Zalta & Chambless, 2012). Therefore, social support and mastery may be less likely to buffer against the negative effects of stress for adolescent females, possibly contributing to increased stress sensitivity and risk for anxiety and depression. Importantly, this cross-sectional study cannot account for possible bi-directional relationships between stress exposure, symptoms of anxiety and depression, and social support. For instance, depressed adolescents

may exhibit overly negative views, a high need for reassurance, and may avoid social situations, increasing the likelihood of negative reactions and interpersonal difficulties in their relationships and social rejection (Ren, Qin, Zhang, & Zhang, 2018). Given the high rates of internalizing psychopathology among adolescent girls, future longitudinal research should evaluate whether pre-stress social support or additional internal or external resources may be associated with resilience among females specifically.

Study Two

The exposure to negative life events in childhood is common (Furniss, Beyer, & Müller, 2009) and may be particularly detrimental for mental health as young children have a limited ability to cope with stressful experiences (Altshuler & Ruble, 1989; Kerker et al., 2015). Social support from trusted adults may increase a child's ability to cope with adversity (Bean, Pingel, Hallqvist, Berg, & Hammarström, 2019; Chu et al., 2010). Although group based intervention programs have been shown to influence prosocial behaviors and emotion regulation (Graham-Bermann, Miller-Graff, Howell, & Grogan-Kaylor, 2015; Kraag, Zeegers, Kok, Hosman, & Abu-Saad, 2006), it remains unknown whether improvements in prosocial behaviors and emotion regulation abilities as a result of participating in an intervention contribute to improvements in psychological well-being among stress-exposed children. Study two of this dissertation investigated the effectiveness of the Kids Empowerment Program (KEP; Graham-Bermann, 2018) a novel skills-based group intervention aimed at influencing prosocial behaviors, emotion regulation, parent-child-relationship quality, and symptoms of anxiety and depression in children. 200 children ages 6 to 12 years participated in a study evaluating the effectiveness of the Kids' Empowerment Program, a weekly, skills-based group intervention for school-aged children. 118 children participated in the intervention either at their school (n = 64)

or in the community (n = 54). The comparison group consisted of 82 treatment-seeking children who were put on a waitlist and invited to participate in the intervention at a later date. Children completed self-report questionnaires assessing emotion regulation skills and symptoms of anxiety and depression before and after their participation in KEP (12 weeks apart for waitlist). In addition, parents of 92 children (54 experimental; 38 waitlist control group) completed parent questionnaires assessing their child's exposure to distressing events, prosocial behaviors, emotion regulation skills, symptoms of anxiety and depression, and parent-child relationship quality.

Children who participated in KEP exhibited greater reductions in child reported anxiety and parent reported depression, increased feelings of parent-child closeness, and increased use of adaptive emotion regulation skills compared to children on the waitlist. Although stress exposure was related to lower levels of prosocial behaviors and emotion regulation skills at time, stress exposure did not moderate the association between participating in the intervention and prosocial behaviors or emotion regulation skills. These results support KEP as an effective intervention program that influences both mental and social well-being outcomes as well as increases children's repertoire of emotion regulation skills necessary to effectively cope with environmental stressors. Since prosocial behaviors, adaptive emotion regulation skills, and close parent-child relationships have been shown to promote well-being among stress-exposed children (Compas et al., 2017; Ge, Natsuaki, Neiderhiser, & Reiss, 2009; Muratori et al., 2015), participation in KEP may increase the likelihood of resilience for school-aged children, regardless of previous exposure to stress. Furthermore, improvements in prosocial behaviors and adaptive emotion regulation skills from time 1 to time 2 were associated with greater increases in parent-child closeness and reductions in anxiety and depression from time 1 to time 2, suggesting

that changes in these factors may provide a mechanism by which KEP impacts relationship quality and well-being. The understanding of mechanisms underlying treatment effects may help researchers better understand how and why treatments work, improving our ability to develop and improve mental health treatment for children.

Study Three

Exposure to stress including childhood trauma, recent negative life events, and daily hassles have been linked with greater perceived stress and symptoms of anxiety and depression for adults (Brunner, Chandola, & Marmot, 2007; Cho, 2013; Fagundes, Glaser, & Kiecolt-Glaser, 2013; Tennant, 2002). While the vast majority of adults are exposed to at least some stress, only about 50% will experience mental illness during their lifetime (Kessler et al., 1994, 2010). A number of factors have been associated with resilience in adults facing adversity, including the use of social support (Sheikh, Abelsen, & Olsen, 2016) and adaptive coping skills (Mahmoud, Staten, Hall, & Lennie, 2012). Skills-based preventative interventions have been shown to increase the use of social support and problem-focused coping and teach individuals how to determine which coping strategy may be most effective for the situation (Steinhardt & Dolbier, 2008). However, it remains unknown whether changes in the use of social support or coping skills provide a mechanism by which interventions promote well-being. Study three of this dissertation sought to examine whether participation in Mood Lifters™, a novel skills-based group intervention, influenced self-reported use of social support and coping skills and whether changes in these resilience factors provide a mechanism by which participation in the Mood Lifters™ intervention impacts anxiety, depression, and perceived stress. Additionally, this study examined whether the experience of childhood trauma, recent life events, or daily hassles moderated the association between participating in the intervention and changes in the use of

social support and coping skills, and anxiety, depression, and perceived stress. 102 treatment-seeking adults participated in the Mood Lifters™ intervention (n = 77) or joined the waitlist to participate later on (n = 25). Participants completed self-report questionnaires assessing use of coping skills, perceived stress, symptoms of anxiety and depression, and exposure to childhood trauma, recent negative life events, and daily hassles before and after their participation in the Mood Lifters™ intervention (15 weeks apart for waitlist).

We found that participating in the Mood Lifters™ intervention was associated with greater use of support seeking and approach coping behaviors. Reductions in disengagement coping were associated with reductions in symptoms of anxiety, depression, and perceived stress and increases in approach coping and support seeking were associated with reductions in anxiety and perceived stress symptoms. Although tests of mediation were not significant, these findings suggested that changes in the use of coping behaviors may contribute to reductions in perceived stress and symptoms of anxiety as a result of participating in the Mood Lifters™ intervention. Further, we found that the experience of childhood trauma, recent life events, and daily hassles moderated the association between participating in the intervention and changes in coping skills and outcomes. For individuals reporting greater daily hassles, greater engagement in the intervention was associated with greater reductions in avoidance coping and increases in approach coping were associated with reduced anxiety symptoms from time 1 to time 2. In contrast, for participants reporting greater childhood trauma, increases in avoidance related coping and disengagement from time 1 to time 2 were associated with greater reductions in anxiety and perceived stress symptoms. These findings are in line with previous research suggesting that coping skills vary in adaptability based on the context of the stressor (Folkman, 1984; Lazarus & Folkman, 1984; Steinhardt & Dolbier, 2008). Daily hassles are more within

one's control, so the use of problem-focused coping skills such as approach coping may be more effective (Mahmoud et al., 2012). In contrast, the experience of childhood trauma is outside an individual's control and therefore more emotion-coping strategies, such as avoidance and disengagement, may be better suited to coping with these stressors (Steinhardt & Dolbier, 2008). These findings suggest that the Mood Lifters™ intervention encouraged individuals to develop the appropriate coping skills needed to adequately cope with their own unique stressors. These data have important implications for future research on coping skills and resilience in adults exposed to different types of stressors. Effective interventions may teach individuals how to differentially use emotion and problem-focused coping depending on the stressor, rather than focusing on increasing adaptive coping strategies or decreasing maladaptive coping strategies overall.

Contributions to the Literature and Future Directions

Overall, this dissertation supported previous literature suggesting that internal and external resources such as social support, coping skills, and mastery promote resilience among stress-exposed children, adolescents, and adults (Bean et al., 2019; Bovier et al., 2004; Chu et al., 2010; Mahmoud et al., 2012; Sheikh et al., 2016; Southwick et al., 2016). Furthermore, the findings from this dissertation were consistent with the hypothesis that resilience is modifiable and teachable (Chmitorz et al., 2018). Finally, this dissertation demonstrates the effectiveness of two novel skills-based interventions at promoting resilience factors and well-being among school-aged children and adults, supporting previous research suggesting that interventions may bolster factors associated with resilience (Graham-Bermann et al., 2015; Kraag et al., 2006; Steinhardt & Dolbier, 2008).

This dissertation also provided significant contributions to the current understanding of resilience. First, this dissertation examined differences in actual stress exposure versus the subjective experience of stress in order to investigate the role of stress sensitivity in resilience. Variations in the perception of stress may vary both due to the greater subjective experience of stress, which may reflect a reduced ability to cope effectively with stressors, as well as increased exposure to more severe or chronic stressors. An examination of stress sensitivity, that is the variations in the degree of stress individuals experience given similar contextual stressors, may better elucidate factors associated with resilience. Future research should continue to examine factors associated with stress sensitivity across the lifespan in order to better identify factors associated with resilience and the link between stress exposure and negative mental health outcomes.

Secondly, this dissertation highlighted the importance of gender differences in the use of and effectiveness of social support. While some research has identified gender differences in the buffering effect of social support on stress exposure in adolescence, findings have been variable and inconclusive (Dishion & Owen, 2002; Kerr, Preuss, & King, 2006; Landman-Peeters et al., 2005; Prinstein, Boergers, & Spirito, 2001; Rueger, Malecki, & Demaray, 2008; Rueger, Malecki, Pyun, Aycock, & Coyle, 2016). The findings of this dissertation suggested that while social support may be valued more by females and used more often for coping (Belle et al., 1987; Rueger et al., 2008, 2010), females may be more likely to experience and be negatively affected by negative interpersonal events, potentially increasing risk for negative mental health outcomes. However, this cross-sectional study cannot account for possible bi-directional relationships. Future research using longitudinal studies should investigate whether pre-stress

levels of social support or other internal or external resources may promote resilience among adolescent females.

Finally, this dissertation provided support for the effectiveness of two novel skills-based interventions, KEP and Mood Lifters™, to improve the use of effective coping skills. Further, changes in coping abilities might partially explain the positive effects of the programs on well-being, providing a possible mechanism by which these interventions promote well-being. Support for these group-based interventions that can be run by paraprofessionals is effective at promoting and may increase access to care. Future research with larger samples with more social, racial, ethnic, and gender diversity is needed in order to continue examining the efficacy of KEP and Mood Lifters™ to bolster resilience factors and promote well-being.

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